Occupational therapist-led mindfulness-based stress reduction for older adults living with subjective cognitive decline or mild cognitive impairment in primary care: a feasibility randomized controlled trial

by

Todd D. Tran

A thesis submitted to the Graduate Program in Aging and Health

in conformity with the requirements for the

Degree of Doctor of Philosophy

Queen's University

Kingston, Ontario, Canada

(May 2023)

Abstract

Community-dwelling older adults with subjective cognitive decline or mild cognitive impairment experience functional performance issues, resulting in a decreased satisfaction with their overall everyday performance. Additionally, cognitive decline has been associated with anxiety and depression among older adults. These psychological issues may further exacerbate cognitive decline.

Consequently, exploring and evaluating non-pharmacologic interventions such as behavioural strategies on its own or in parallel with pharmacological interventions to mitigate concomitant psychological factors or support self-perceived functional performance and satisfaction with performance would be critical.   Occupational therapists are well-positioned to address both the psychological and functional needs of older adults experiencing cognitive decline in a primary care setting.

This dissertation evaluated an occupational therapy-led Mindfulness-Based Stress Reduction (MBSR) program among older adults with early cognitive deficits, and has two AIMS:

AIM 1: To explore the feasibility of conducting a full-scale randomized control trial (RCT) of an MBSR program, in an interprofessional primary care setting, with the objective to: 1a. Assess rates of recruitment, adherence, and retention, 1b. Explore the acceptability of using computer tablets for intervention and data collection and 1c. Explore the participants' and healthcare providers' perspectives and acceptability of technology in the MBSR program.

AIM 2: To evaluate the impact of MBSR on self-perceived functional performance and satisfaction and psychological outcomes to: 2a. Determine the effect sizes of these clinical outcomes.

A convergent mixed-methods, feasibility RCT was used. Participants were randomized into an MBSR or wait-list control group and were compared at three different time points (week-0, week-9 and week-13) on primary and secondary clinical outcomes. Data analysis examined the quantitative and qualitative data separately and were then merged for comparative analysis to best understand the feasibility of a larger clinical trial and to explore clinical outcomes.

Our pilot RCT investigation found a significant reduction in anxiety but did not show improvements in other outcomes. Additionally, our feasibility rates had lower-than-expected outcomes, but with minor modifications to our current design, it is well suited for a full RCT. Last, based on the qualitative findings, we found that MBSR is feasible for practice in an interprofessional primary care setting.

Co-Authorship

Two of the three manuscripts in this dissertation have been published and the third has been accepted for publication.

Manuscript One (Chapter Three)

Tran, T., Donnelly, C., Nalder, E., Trothen, T., Finlayson, M. (2020). Occupational therapist-led mindfulness-based stress reduction for older adults living with subjective cognitive decline or mild cognitive impairment in primary care: A feasibility randomized control trial protocol. BMJ Open 2020; 10:e035299. doi:10.1136/ bmjopen-2019-035299 (Published)

Manuscript Two (Chapter Four)

Tran, T., Donnelly, C., Nalder, E., Trothen, T., Finlayson, M., (2023). Mindfulness-based stress reduction for community-dwelling older adults with subjective cognitive decline (SCD) and mild cognitive impairment (MCI) in primary care: A mixed-methods feasibility randomized control trial. BMC Primary Care 2023 (Published)

Manuscript Three (Chapter Five)

Tran, T., Nalder, E., Trothen, T., Finlayson, M., Donnelly, C. (2023). Occupational therapist-led mindfulness training program for older adults living with early cognitive decline in primary care: A pilot randomized controlled trial. (Accepted: Submitted to the Journal of Alzheimer's Disease Reports)

Acknowledgements

First and foremost, this dissertation would not have come to fruition without my supervisor, **Dr. Catherine Donnelly**. I am deeply grateful for her generosity of time and support throughout my Ph.D. You are a real inspiration, and I am one of the luckiest people to not only have crossed paths with you but to have your help, guidance, and mentorship. All of which I will draw upon and model in my future career. You are extraordinary beyond words.

I would also like to thank my supervisory committee members for their support, guidance and expertise, **Drs. Marcia Finlayson**, **Emily Nalder** and **Tracy Trothen** (my course instructor for Ethics in Aging). I am grateful for all your invaluable feedback and comments in making this research project a successful reality.

To my thesis defense examiners **Drs. Kevin Woo** (course instructor in Aging Theory), **Dorothy Kessler** (instructor for Comprehensives), **Roger Pilon**, and **Shlomit Rotenberg**, thank you for taking your precious time to give me detailed comments and feedback on my dissertation. You all have helped me to meet the standards of academic excellence, which I am grateful for.

I would also like to acknowledge my deep appreciation and gratitude to the funders for their generous support, **Centre for Aging and Brain Health Innovation** (CABHI) and **VHA Home Healthcare**, to purchase the technology (e.g., iPads etc.), without which, this dissertation would not have been possible.

With deep gratitude to all the **participants**, thank you for being generous with your time and involvement in this research project. I am also thankful for **Women's College Hospital,** where I work, and for allowing this research project to occur. I hope I have demonstrated the importance of this work and have made an impact.

I would like to thank my fellow graduate students for supporting me throughout the journey, **Lynn Haslam**, for starting this journey with me as we were the inaugural duo in the Aging and Health program in the School of Rehabilitation Therapy. **Jodi Webber,** for a memorable experience writing at your cottage in Southampton. It was such a lovely retreat away to write without interruptions. **Amanda Mofina**, thank you for checking in and supporting me through phone chats. I would also like to thank **Ashley Williams** for all your support through the writing process over the phone and eventually on Focusmate. We developed a lovely friendship working on our dissertation together. Your heartfelt support, encouragement, and generosity of your presence is what got me through the final stages of my Ph.D., and for that, it will never be forgotten. **Collette Steer**, thank you for all you do with putting on the Dissertation Bootcamps in person, virtually and at Elbow Lake. It made the writing process that much easier. **Susan Hum**, your friendship, unwavering support, and feedback on the manuscripts were invaluable.

To my family, thank you for all your love, **Mom**, **Dad**, **Le Tran**, **Sohail Khan**, and my three adorable nephews, **Liam**, **Quinn,** and **Zain**. I love you guys so much. I hope to spend more time with all of you now that I am finished 😊.

To **Paul Thorne**, my housemate extraordinaire, thank you for your ongoing support through this Ph.D. journey. I could not have done this without our spontaneous conversations, laughter, and a dose of reality TV (e.g., Housewives, Netflix) when needed.

Finally, to **William Moore**, I cannot express enough gratitude for your encouragement, support and - most of all – your patience throughout this journey. Here is to more sunny destinations, Michelin-star restaurants and all the beautiful things life has to offer now that I am no longer a Ph.D. student.

Table of Contents

Table of Contents

Abstract ii

Co-Authorship iv

Acknowledgements v

Table of Contents vii

Chapter 1 : Introduction 1

Research Statement 1

Background on Older Adults with Cognitive Decline (SCD and MCI) 1

Challenges and Inefficiency with instrumental Activities-of-Daily Living (iADL) 2

Cognitive Decline and Everyday Technology 3

Psychological Issues (anxiety, depression) Living with SCD and MCI 4

Mindfulness 6

Theoretical Approach 8

i. Insight (Three Characteristics) 8

ii. Attention Regulation 9

iii. Acceptance and Compassion 10

Research objectives 12

Overview of the Dissertation 13

References 15

Chapter 2 : Literature Review 27

Primary Care Teams and the Role of Occupational Therapy Among Community-Dwelling Older Adults with SCD or MCI 27

Mindfulness and Healthy Older Adults, Implications on (i) *Psychological* and (ii) *Cognitive Outcomes* 31

(i) Psychological outcomes 31

(ii) Cognitive outcomes 32

Mindfulness and Older Adults with SCD, MCI and Dementia, Implications on (i) Psychological and cognitive outcomes, (ii) Self-reported everyday functioning (iADLs and ADLs), and (iii) Occupational therapy 34

(i) Psychological outcomes and cognitive outcomes 34

(ii) Self-reported everyday functioning (iADLs, ADLs) 35

Mindfulness in primary care and implications of technology-based applications for older adults 37

Mindfulness and Implications of Technology-Based Applications in Primary Care for Older Adults .. 38

Conclusion 39

References 41

Chapter 3 - An occupational therapist-led Mindfulness-Based Stress Reduction for older adults living with subjective cognitive decline or mild cognitive impairment in primary care: A feasibility randomized control trial protocol 53

Abstract 54

Introduction 56

Primary Aim: 58

Secondary Aim: 59

Methods 59

Study Setting 62

Eligibility Criteria 62

Inclusion Criteria: 62

Exclusion Criteria: 62

Intervention/Treatment (MBSR) Group 63

Assessment of Intervention (MBSR) Treatment Fidelity 65

Primary AIM: Feasibility Outcome Measures 66

Objective 1a: Feasibility Measures 66

Objective 1b: Acceptability of technology 67

Objective 1c: Satisfaction with the MBSR program 67

Secondary AIM: Clinical Outcome Measures 68

Quantitative Data ... 68
Time of Outcome Measures ... 69
Clinical Outcome Measures ... 69
Primary Outcome ... 69
Canadian Occupational Performance Measure ... 69
Secondary Outcome ... 70
Patient Health Questionnaire (PHQ-9) ... 70
Geriatric Anxiety Inventory (GAI) ... 70
Perceived Stress Scale (PSS) ... 70
The Cognitive and Affective Mindfulness Scale-Revised (CAMS-R) ... 70
Quality-of-Life in Alzheimer's Disease (QoL-AD) ... 71
Acceptance and Action Questionnaire-II (AAQ-II) ... 71
Table 3.1 Timeframe of Measurements for participants in MBSR Intervention ... 72
Sample Size ... 72
Recruitment ... 72
Treatment allocation and randomization ... 73
Blinding ... 74
Data Management ... 74
Qualitative Analysis ... 75
Quantitative Analysis ... 76
(Insight Timer – App metrics): ... 77
Benefits of Participants ... 77
Patient and public involvement ... 78
References ... 79
Chapter 4 – Mindfulness-based stress reduction for community-dwelling older adults with subjective cognitive decline (SCD) and mild cognitive impairment (MCI) in primary care: A mixed-methods feasibility randomized control trial ... 88

Abstract 89
Background 91
Methods 94
Study design 94
Ethical Considerations 95
Study setting 95
Eligibility criteria 95
Recruitment 96
Treatment allocation and randomization 96
Intervention/treatment (MBSR) group 97
Table 4.2: Timeframe of Measurement 100
Data Collection 101
Quantitative Data 101
Feasibility outcome measures and acceptability of technology 101
Objectives 1(a): Feasibility outcome measures 101
Objectives 1(b): Acceptability of Technology 103
Qualitative Data 103
Qualitative data collection 103
Data Analysis 103
Feasibility outcome measures and acceptability of technology 103
Qualitative Analysis 104
Data integration 104
Results 105
Table 4.3 – Characteristics of 14 participants in the 9-week MBSR Program 106
Feasibility outcome measures and acceptability of technology 107
Objectives 1(a): Feasibility outcome measures 107
6. Recruitment rates 107

Table 4.4 – Recruitment rates 107
2. Retention Rates 109
3. Adherence Rates Data 109
Objectives 1(b): Acceptability of Technology 110
Table 4.5 – Feasibility outcomes 111
Qualitative Findings 111
Table 4.6 – Major themes and sub-themes 113
Theme 1: Acceptability/Unique Features of Primary Care 114
Theme 2: Satisfaction and Perceived Benefits of MBSR 115
Theme 3: Acceptability of Technology, Connecting with the World 117
Discussion 118
Strengths and Limitations 125
Conclusion 126
References 127
Chapter 5 – Occupational therapist-led Mindfulness Training Program for Older Adults Living with early Cognitive Decline in Primary Care: A Pilot Randomized Controlled Trial 138
Abstract 139
Background: 140
Methods 144
Study design 144
Study setting 145
Participants 145
Recruitment 146
Randomization 146
Blinding 147
Sample size 147
Intervention procedures 147

Ethical considerations 149
Measurement and Timeline 149
Data analysis 153
Participant demographics 154
Primary clinical outcome 158
COPM – Performance (average and change scores) 158
Discussion 163
References 169
Chapter 6 : Discussion 183
Introduction 183
Summary of Findings 184
Primary Care Service Delivery Models, Roles and Practice Implications 186
Patient Medical Home (PMH) 186
Starfield's Core Elements of Primary Care and Primary Care-based Memory Clinic 188
Secondary Health Promotion Attributes of the Occupational Therapy-led MBSR Program 191
Critical Clinical Implications for Occupational Therapists 194
Technology as the new instrumental of activities of daily living (iADL) 194
Methodological Reflection and Lessons Learned 196
Conceptual Theoretical Framework for MBSR and Occupational Therapy 202
Next steps for a future RCT: Cognitive decline and functional implications 205
Implications and recommendations of the doctoral thesis 206
Limitations of the Doctoral Dissertation 209
Conclusion 211
References 213
APPENDICES 223
Appendix A: Informed Consent Form for Participants 223
Appendix B: Informed Consent Form for Clinicians 233

Appendix C – Recruitment Ad for the Study..242
Appendix C: REB Clearance Letter from WCH..243
Appendix D: REB Clearance Letter from Queen's University..245
Appendix E: Outcome Measures 247
Appendix F: Patient Demographic Questionnaire 268
Appendix G: Focus Group Questions (Participants)..271
Appendix H: Semi-Structured Interview Questions (Occupational Therapists)..................................274

List of Tables

Table 3.1: Timeframe of Measurements for participants in MBSR intervention 80

Table 4.1: Outline of the MBSR/Intervention 106

Table 4.2: Timeframe of Measurements 107

Table 4.3: Characteristics of 14 participants in the 9-week MBSR program 113

Table 4.4: Recruitment rates 114

Table 4.5: Feasibility outcomes 118

Table 4.6: Major themes and sub-themes 119

Table 5.1: Timeframe of Measurements for Participants 158

Table 5.2: Demographics and characteristics of participants 162

Table 5.3: Mean and Standard Deviation (All Data) 165

Table 5.4: Independent t-test between groups at different time points 166

List of Figures

Figure 3.1: SPIRIT flow diagram 71

Figure 3.2: Protocol flow chart 72

Figure 4.1: Recruitment and retention of participants 115

Figure 5.1: SPIRIT flow Chart 161

Figure 6.1: MBSR health service delivery model 198

List of Abbreviations

ADL	Activities-of-daily living
APPs	(mobile) Applications
COPM	Canadian occupational performance measure
FHT	Family health team
iADL	Instrumental activities-of-daily living
IHPs	Interprofessional health care providers
IPC	Interprofessional primary care
ITT	Intention to treat
LOCF	Last observation carried forward
MBCT	Mindfulness-based cognitive therapy
MBI	Mindfulness-based interventions
MBSR	Mindfulness-based stress reduction
MCI	Mild cognitive impairment
MoCA	Montreal cognitive assessment
PCMC	Primary care-based memory clinic
PMH	Patient medical home
QoL	Quality-of-life
RCT	Randomized controlled trial
SCD	Subjective cognitive decline
WLC	Wait-list control

Chapter 1: Introduction

Research Statement

The overall goal of this dissertation was to determine whether an occupational therapy-led 9-week Mindfulness-Based Stress Reduction (MBSR) program for community-dwelling older adults with subjective cognitive decline (SCD) or mild cognitive impairment (MCI) is feasible for a large-scale RCT in an interprofessional primary care (IPC) setting. The secondary aim was to evaluate the effect sizes of older adults' perceived satisfaction with functional performance as measured by the Canadian Occupational Performance Measure (COPM) and psychological outcomes after participating in the MBSR program.

Background on Older Adults with Cognitive Decline (SCD and MCI)

It is estimated that 25-50% of community-dwelling older adults over 65 years of age will experience cognitive decline, such as SCD (Zuniga, Mackenzie, Kramer, & McAuley, 2016; Si, Xing, Han, 2020). SCD is characterized by increased compensatory cognitive efforts, while experiencing subtle cognitive decline. Older adults with SCD may experience self-perceived decline in memory occurring within the past five years. Persons with SCD report concerns or worry and feelings of worsening functional performance compared to their peers without cognitive decline (Jessen et al., 2014). In recent years, SCD has been updated to include two updated features (i) a self-experienced persistent decline in cognitive capacity, compared with a previously normal cognitive status and observation by others is not required and (ii) normal performance on standardized cognitive tests used to classify MCI, adjusted for age, sex and education (Jessen et al., 2020).

There is emerging evidence that SCD could be the earliest predictor of MCI and Alzheimer's disease and related forms of dementia (ADRD) and should be considered a risk factor for objective cognitive disorders (Rabin et al., 2015; Liew, 2020; Wang et al., 2021). Last, SCD has several common names, including subjective cognitive complaints, subjective memory decline and subjective memory complains (Wang et al., 2021).

Approximately 10-20% of Canadians 65 years of age and older with SCD will progress to MCI or prodromal Alzheimer's disease (Fitzpatrick-Lewis, Warren, Ali, Sherifali, & Raina, 2015). It has been reported that within five to six years of follow-up, approximately 50-80% of patients with MCI will have converted to ADRD (Schmidtke & Hermeneit, 2008; Shigemizu et al., 2020). However, ADRD is not a trajectory of aging, as a subgroup of MCI patients remained stable or revert back to normal (Ganguli et al., 2019).

According to the Diagnostic and Statistical Manual for Mental Disorders (DSM-5), the clinical features of MCI include: (i) concerns raised by the individual or an informant, or observations made by a clinician; (ii) preservation of basic functional independence (e.g. bathing, dressing, toileting); and (iii) cognitive impairment in one or more cognitive domains, relative to appropriate normative data for that individual (American Psychiatric & American Psychiatric Association, 2013; Petersen et al., 2014). Impairment in the cognitive domain may include: learning and memory, language, visuospatial ability, executive function, and psychomotor skills (Knopman & Petersen, 2014). MCI differs from dementia, as it impacts only one cognitive domain, whereas dementia affects two or more domains.

Challenges and Inefficiency with instrumental Activities-of-Daily Living (iADL)

A large body of evidence illustrates the challenges and inefficiency experienced by those living with cognitive decline in performing more complex instrumental activities-of-daily living (iADL) (Belchior, Korner-Bitensky, Holmes, & Robert, 2015). Some examples of functional challenges with iADL include difficulty with legal and financial management, trouble recalling recent conversations, travelling, medication management, and keeping appointments (Belchior et al., 2015; Jekel et al., 2015; Regan & Varanelli, 2013; Tomaszewski et al., 2018). Due to the higher cognitive demand required for these complex iADL, some older adults with SCD or MCI may eventually discontinue certain activities (e.g., hobbies and leisure activities) (De Vriendt et al., 2012; Reppermund et al., 2011). By giving up these more complex activities, older adults may experience a general sense of discontentment and decreased satisfaction in their functional performance (De Vriendt et al., 2012). Thus, a clinical intervention that supports self-perceived satisfaction on functional performance or that provides mental adjustments to an individual's self-perceived functional changes could be welcomed by this older population.

Cognitive Decline and Everyday Technology

There is emerging evidence that older adults with cognitive decline experience functional changes in managing everyday technology (e.g., electronic household appliances, remote controls, cell phones) when compared to their peers without cognitive concerns (Belchior et al., 2015; Jekel et al., 2015; Hedman et al., 2018). There is a moderately strong inverse association between engagement in everyday activities and perceived difficulty in everyday technology use (Nygård, Pantzar, Uppgard, & Kottorp, 2012), which may have a negative impact on a person's psychological health.

It has been suggested that feasibility testing of smartphones and tablets as platforms to support everyday functioning in older adults with cognitive decline should be conducted (Hedman, Nygård, Malinowsky, Almkvist, & Kottorp, 2016). However, studies exploring the feasibility of technology use (i.e., computer tablets) with older adults with SCD or MCI within various health service delivery settings are limited (Wahbeh, Goodrich, & Oken, 2016).

Psychological Issues (anxiety, depression) Living with SCD and MCI

Living with SCD or receiving an MCI diagnosis is usually life-altering and may have a negative impact on an individual's emotional health and well-being (Regan & Varanelli, 2013). Additionally, living with cognitive deficits and noticing less efficiency or greater difficulty in performing functional tasks may invoke fear of dependency on others, and activity limitations (Johansson, Marcusson, & Wressle, 2015); both which may increase anxiety and depressive mood (Joosten-Weyn Banningh, Vernooy-Dassen, Olde Rikkert, & Teunisse, 2008; Wettstein, Seidl, Wahl, Shoval, & Heinik, 2014). This cumulative impact of cognitive decline and experiences of decreased functional performance may have a negative impact on an individual's emotional well-being and on their quality-of-life (QoL) (Bárrios et al., 2013). In turn, older adults who experience difficulty in coping or adjusting to their cognitive decline may experience emotional distress, which can further exacerbate cognitive decline (Metternich, Kosch, Kriston, Härter, & Hüll, 2009; Regan & Varanelli, 2013; Nagaoka, Hashimoto, Takeuchi, Sado, 2021). Moreover, the literature has reported that older adults living with chronic depression and anxiety are almost twice as likely to have memory complaints (Sohrabi et al., 2009), which is potentially a modifiable risk factor for dementia (Kuring, Mathias, & Ward, 2018).

Currently, there is emerging evidence supporting the use of pharmacologic interventions to alleviate depressive disorders among individuals with cognitive impairment (Perini et al., 2019). However, medication use poses a risk for adverse side-effects, especially for persons with multiple medical comorbidities, and drug-drug interactions, potentially leading to worsening cognition (Ford & Almeida, 2017, Levine et al., 2021). Another issue is that polypharmacy increases the risk of falls by 21% compared to those older adults without polypharmacy (Dhalwani et al., 2017; Kok & Reynolds, 2017). Furthermore, it has been noted that there is a higher incidence of falls with cognitive impairment individuals in primary care (Quach et al., 2019).

Consequently, exploring non-pharmacologic interventions such as behavioural strategies on its own or in parallel with pharmacological interventions to mitigate concomitant psychological factors or functional outcomes are essential for this population (Moniz-Cook, 2011; Regan & Varanelli, 2013, Zhu et al., 2021). Non-pharmacological interventions that can assist persons with SCD or MCI include educational (Woo, 2017) or support group programs that focus on concomitant symptom management (Joosten-Weyn Banningh, Kessels, Olde Rikkert, Geleijns-Lanting, & Kraaimaat, 2008). Using evidence-based strategies to reduce perceived stress and manage psychological issues is crucial to optimize successful aging and emotional well-being, which may improve QoL in this population (Geiger et al., 2016; Reichstadt, Sengupta, Depp, Palinkas, & Jeste, 2010).

There is evidence that behavioural therapies, consisting of cognitive memory training (Belleville et al., 2018), physical activity (Lautenschlager, Cox, & Kurz, 2010), and diet (Anastasiou et al., 2017) can mitigate the impact of cognitive impairment on daily function. There is also evidence that psychological interventions including psychotherapy and cognitive-behavioural therapy (CBT) may help persons with SCD or MCI. However, there is currently no one approach, either individual or group intervention, that has emerged as the most appropriate or well-researched for this older population (Regan & Varanelli, 2013). According to Joosten-Weyn Banningh et al. (2008), coping strategies to support those living with MCI should consist of a support group program that deals with a combination of factors, including concomitant symptoms (Joosten-Weyn Banningh et al., 2008).

Mindfulness

Emerging evidence suggests that mindfulness may be beneficial for those living with early cognitive decline. Mindfulness meditation was developed from Buddhist traditions to liberate a person from suffering or to assist with *salvific* goals (e.g., decreasing suffering and realizing impermanence). Buddhist mindfulness meditation is a systematic cultivation practice described as “a focused, neutral, and non-judgmental observation of breathing, body postures, body states, and sensation and perceptions, including respective emotional qualities” p. 449 (Schlieter, 2017). Mindfulness is designed in a way that allows it to be beneficial to everyone regardless of their religious or non-religious beliefs and attitudes (Schlieter, 2017; Wilson, 2014), and has been delivered in a secular fashion in clinical settings. Research on mindfulness has mainly focused on clinical evidence for *salutogenic* health effects, focusing on the physical and mental health benefits of meditation which is the focus of this study. There are other forms of mindfulness meditation including:

i. *Transcendental meditation* (e.g., Kirtan Kriyan) which involves chanting or using a mantra) (Benedicto, 2016).

ii. *Yoga meditation* (e.g., Isha Yoga tradition) is a form of yoga, which includes Asanas (yoga postures), Kriyas (specific breathing techniques and body postures) and sitting meditation (Shoonya and Samyama meditations). Another yoga meditation is Himalayan Yoga, an ancient tradition consisting of many steps and paths that are integrated and interrelated. In this tradition, there is also an emphasis on the breath that should be flowing without pauses (Braboszcz et al., 2017).

iii. *Vipassana meditation* - Vipassanā practices involve paying attention to various aspects of experience, such as your thoughts, emotions, and physical sensations.

The most successful therapeutic application and the most researched mindfulness modality is mindfulness-based stress reduction (MBSR) – an 8-week intervention developed by Kabat-Zinn (2009). According to Kabat-Zinn (2006), mindfulness is defined as “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally” (p.14); (Kabat-Zinn & University of Massachusetts Medical Center/Worcester. Stress Reduction, 2009). Kabat-Zinn developed this technique from various meditative practices, including those from Buddhist teachers and traditions, Indian yogi methods and philosophy. He also incorporates biological and psychological underpinnings while removing all explicit religious symbolism, philosophy, and language from these meditative practices. The MBSR program helps individuals suffering from stress, pain and illness who have not responded to other clinical interventions. Today, MBSR is used for various clinical diagnoses ranging from psychiatric (e.g., depression, anxiety, perceived stress) to other clinical illnesses (e.g., HIV, diabetes, cancer). It is widely taught in hospitals, community centres, universities, schools and in private practice (Khoury, Sharma, Rush, & Fournier, 2015).

Evidence from recent years suggests that MBSR could benefit those living with SCD and MCI (Fam et al., 2020; Marchant et al., 2021). Mindfulness has been shown to be beneficial in multiple ways. First, it may be neuroprotective against cognitive decline (Smart et al., 2016; Shim et al., 2021). Second, it has demonstrated mental health benefits for older adults and those living with chronic illnesses by reducing emotional distress, including worry (Fjorback et al., 2011; Smoski et al., 2016; Shim et al., 2021). Third, it has been shown to decrease feelings of loneliness, depression, anxiety, and significantly increases mood and positive affect (Black et al., 2015; Creswell et al., 2012; Foulk et al., 2014; Geiger et al., 2016; Splevins et al., 2009).

The meditation format of MBSR consists of lying down (e.g., doing a body scan), sitting (e.g., focusing on the breath), and mindful movement (e.g., yoga and walking). Each session starts with a mindfulness practice, followed by an inquiry or discussion linked to each of the curricular themes. All of the guided instructions are in the present tense (e.g., verbs ending in -ing), e.g., "notic*ing* the sensations of the breath", "mov*ing* your attention to", "shin*ing* the spotlight of awareness to", "follow*ing* the breath…" (Crane et al., Version 2016). After leading a meditation practice, the MBSR teacher inquires what the participants noticed. Inquiry encourages reflection and exploration of participants' experiences and invites a group discussion of what is being discovered. The MBSR teachers can then link these discoveries to the learning themes of the program (Crane et al., 2015).

Theoretical Approach

The Buddhist Psychological Model (BPM) proposed by Grabovac et al. (2011) provides a framework that describes both the underlying mechanisms of mindfulness and the changes in cognitive processes that may occur with mindfulness training. The BPM explains how mental proliferation (e.g., rumination, stress, anxiety, depressive mood) and clinical symptoms are alleviated, and thus, promotes a sense of well-being and enhanced QoL. The three mechanisms of mindfulness that influence cognitive processes include: (1) insight, (2) attention regulation and (3) acceptance/compassion (Grabovac et al., 2011).

i. Insight (Three Characteristics)

The three essential characteristics of Buddhist thought associated with mindfulness practice include *impermanence, suffering, and "not-self"*: (i.) *Impermanence* refers to the fact that sense impressions and mental events are transient (i.e., they arise and pass away) (ii.) *Suffering* is experienced by everyone and refers to habitual reactions based on attachment and aversion to the feelings of a sense impression or mental event. This habitual reaction to attachment and aversion can lead to suffering. In Buddhist psychology, individuals habitually attach to pleasant events such as a *craving* for food, drink, sex or attachment to other people and relationships (Aylward, 2007) or of wanting only pleasant experiences. These attachments, lead to suffering. Conversely to attachment, but achieving similar effects, aversion involves rejecting or pushing away unpleasant events, and can also lead to suffering, and increase mental proliferation. The BPM posits that aversion decreases acceptance and compassion, which increases suffering (i.e., an inverse relationship to well-being). When attachment and aversion, is not experienced with awareness, they become reactive and habitual. However, when an individual recognizes these habitual reactions, they can choose to respond with compassion, loving-kindness and thus reduce their mental proliferation and suffering. Last, (iii.) The Buddhist concept of *Not-self* – is based on the belief that impressions and mental events do not contain or constitute any lasting, separate entity that could be called self (e.g., not to take things personally).

In summary, mindfulness meditation seeks to improve well-being by allowing sensory and mental events to naturally arise and fall away, *reducing* attachment or aversion and letting things be as they are, reducing clinical symptoms of mental proliferation such as anxiety, depressive mood, and perceived stress (Grabovac et al., 2011).

ii. Attention Regulation

A*ttention regulation* based on the BPM suggests that attentional resources are limited, and only one object can be held into awareness at a time which may momentarily reduce mental proliferation. For example, the formal practice of meditation includes awareness of the breath. Awareness of the sensations of the breath is thought to disrupt mental proliferation (Grabovac et al., 2011).

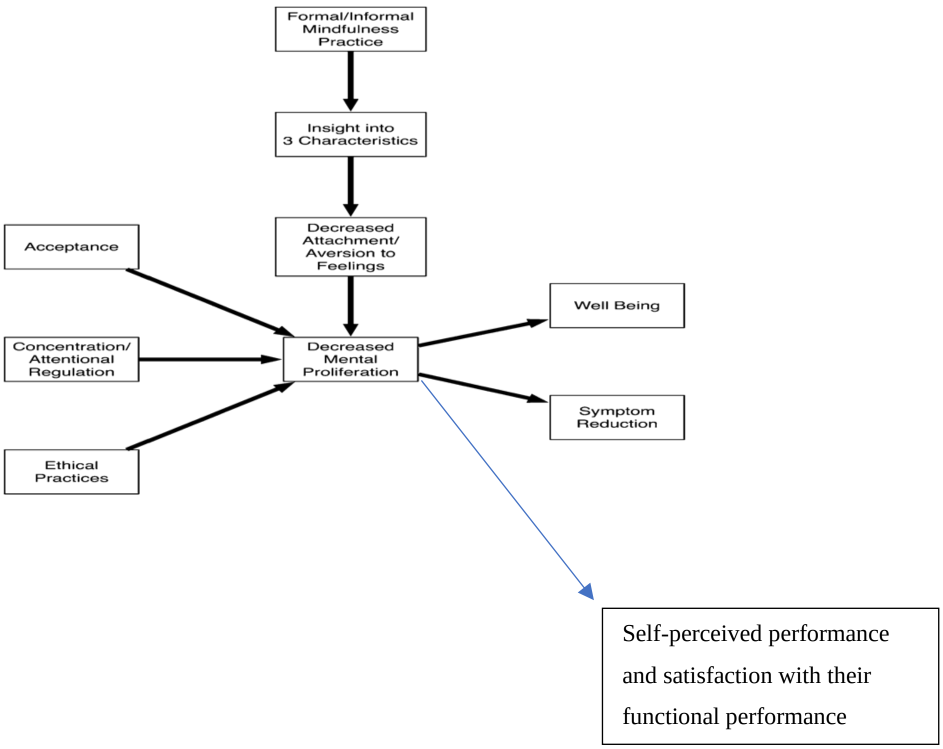
iii. Acceptance and Compassion

An attitude of acceptance and compassion prevents mental proliferation by reducing negative thoughts (e.g., self-judgment) from arising, relaxing attention, and allowing awareness of the arising and passing of sense impressions and mental events. The self-acceptance is hypothesized to improve clinical symptoms such as anxiety, depressed mood and perceived stress and further promote a sense of well-being and improved QoL (Carmody et al., 2009; Grabovac et al., 2011).

The BPM has two key outcomes: 1) symptom reduction and 2) enhanced QoL. However, the BPM is insufficient on its own to describe the additional occupational therapy lens that has been included in the study. Thus, for the purpose of my dissertation, I broadened the BPM conceptual framework (2011) to include an occupational therapy perspective, informed by the Canadian Model of Occupational Performance and Engagement (CMOP-E). The CMOP-E model consists of three components i. The person (with spirituality at the core) ii. Occupations, which are groups of activities and tasks of everyday life; that people do to occupy themselves, including looking after themselves (self-care). Occupations contribute to the social and economic fabric of their communities (productivity), and to the enjoyment of life (leisure), and iii. The environment includes social, institutional, physical, and cultural dimensions. *Occupational performance* is “the result of a dynamic, interwoven relationship between person, environment, and occupation over a person’s lifespan; the ability to choose, organize, and satisfactorily perform meaningful occupations that are culturally defined and age appropriate for looking after oneself, enjoying life, and contributing to the social and economic fabric of a community" (Townsend & Polatajko, 2013). Going forward in this dissertation, occupation performance will be replaced with the term *function* for ease of understanding among non-occupational therapy audience. On the other hand, dysfunction occurs when there is a disruption to any of these three components (Cole & Tufano, 2008; Townsend & Polatajko, 2013), resulting in functional (occupational) performance issues. In this example, a person living with SCD or MCI, experiences cognitive (e.g., memory) and/or affective (e.g., anxiety and/or depressive symptoms) deficits which may impact their self-perceived performance and satisfaction with their functional performance of complex tasks (occupation) in their everyday life (environment).

Currently, little is known about how mindfulness is being applied in relation to human occupation as there is a gap in our understanding with respect to mindfulness and occupational engagement. However, there is emerging research exploring how mindfulness influences engagement in occupation by allowing for the discovery of a deeper understanding of the process of "doing" occupations as well as "being" in everyday life participation, which may lead to positive health outcomes (Goodman et al., 2019). In particular, a study by Henton et al. (2022) explored how mindfulness positively impacted occupational engagement and decreased perceived stress among graduate students. These positive benefits of mindfulness on occupational engagement could be used with older adults living with SCD or MCI as they may disengage in their everyday activities related to their decreased level of cognitive performance.

There is a need for an intervention that addresses self-identified functional difficulties to support those with SCD or MCI and impact occupational engagement. Thus, exploring how mindfulness may influence self-reported occupational performance among older adults with SCD or MCI may be fruitful. Maximizing meaningful occupational engagement through mindfulness with this population could be an important area to inform occupational therapists. Furthermore, exploring how engaging in occupation mindfully may influence various health outcomes from an affective, cognitive, or behavioural perspective would also be worthwhile to explore. As such, this dissertation will use an integrated BPM and CMOP-E framework will guide the study's aims and objectives.



(Grabovac et al., 2011; Townsend et al., 2013)

Research objectives

The overarching purpose of this dissertation was to determine whether an occupational therapy-led 9-week MBSR program for community-dwelling older adults with early cognitive decline is feasible for a larger-scale RCT in an IPC setting. This research used a convergent mixed-methods feasibility randomized control trial (RCT) to achieve our two main AIMs with the following objectives.

AIM 1: To explore the feasibility of conducting a randomized control trial (RCT) of an occupational therapist-led MBSR program in an IPC setting. Specifically, to:

1a. Assess feasibility outcomes such as the rates of participant recruitment, adherence, and retention (Quantitative)

1b. Explore the acceptability of technology-based computer tablets (i.e., iPads) for intervention delivery, and data collection in the MBSR group (Qualitative)

1 c. Explore the perspectives of participants' (older adults with cognitive decline; focus group) and health care providers (occupational therapists'; individual interviews) concerning satisfaction (e.g., the intervention and its delivery), perceived value, barriers and facilitators of implementing the MBSR program (Qualitative)

AIM 2: To evaluate the impact of the MBSR program on participants' self-perceived performance and satisfaction of performance with everyday activities and psychological outcomes.

2a. To evaluate the effect sizes of primary Canadian Occupational Performance (COPM) and secondary clinical outcomes (anxiety, mood, perceived stress, mindfulness, QoL and psychological flexibility) (Quantitative)

Overview of the Dissertation

This dissertation is organized into six chapters. This chapter (**Chapter 1)** is an introductory chapter that introduces the study population, provides the context of early cognitive decline such as SCD and MCI, mindfulness, the role of occupational therapy within primary care, and the theoretical approach that informs this study. **Chapter 2** provides a literature review of critical concepts and provides context to the overarching aim and objectives by discussing the key bodies of literature that are relevant to the central topic of this dissertation. **Chapter 3** describes the methodology and explains the convergent mixed-methods feasibility RCT. This chapter (prepared as a manuscript for a peer-reviewed journal), was published in *BMJ*-Open (Tran et al., 2020) outlining our research protocol. **Chapter 4** presents results from the mixed-methods feasibility study, describing the feasibility outcomes and healthcare providers' and patients' perceptions of facilitators and barriers of the MBSR program in an IPC setting. The study was published in *BMC-Primary Care* (Tran et al., 2023). **Chapter 5** presents the results of the pilot-RCT, to evaluate the effect sizes of the occupational therapy-led MBSR program on the primary outcome of self-perceived performance and satisfaction on the COPM and psychological outcomes involving anxiety, mood, psychological flexibility, QoL and perceived stress. The study has been accepted by *Alzheimer's disease and reports (February 2023)*. Last, **Chapter 6** concludes with overall key findings, general discussion, strengths and limitations, future research and clinical directions, recommendations for research and practice and conclusion.

References

American Psychiatric, A., & American Psychiatric Association, D. S. M. T. F. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.). Washington, D.C: American Psychiatric Association.

Anastasiou, C. A., Yannakoulia, M., Kosmidis, M. H., Dardiotis, E., Hadjigeorgiou, G. M., Sakka, P., . . . Scarmeas, N. (2017). Mediterranean diet and cognitive health: Initial results from the Hellenic Longitudinal Investigation of Ageing and Diet. *PloS one*, *12*(8), e0182048. doi:10.1371/journal.pone.0182048

Andreescu, C., & Varon, D. (2015). New Research on Anxiety Disorders in the Elderly and an Update on Evidence-Based Treatments. *Current Psychiatry Reports, 17*(7), 1-7. doi:10.1007/s11920-015-0595-8

Aylward, R. C. (2007). *Psychology without self: An Abhidhamma Buddhist perspective on the alleviation of suffering.* (Dissertation/Thesis). ProQuest Dissertations Publishing,

Bárrios, H., Narciso, S., Guerreiro, M., Maroco, J., Logsdon, R., & de Mendonça, A. (2013). Quality of life in patients with mild cognitive impairment. *Aging & Mental Health, 17*(3), 287-292. doi:10.1080/13607863.2012.747083

Belchior, P., Korner-Bitensky, N., Holmes, M., & Robert, A. (2015). Identification and assessment of functional performance in mild cognitive impairment: A survey of occupational therapy practices. *Australian Occupational Therapy Journal, 62*(3), 187-196. doi:10.1111/1440-1630.12201

Belleville, S., Hudon, C., Bier, N., Brodeur, C., Gilbert, B., Grenier, S., . . . Gauthier, S. (2018). MEMO+: Efficacy, Durability and Effect of Cognitive Training and Psychosocial

Intervention in Individuals with Mild Cognitive Impairment. *Journal of the American Geriatrics Society, 66*(4), 655-663. doi:10.1111/jgs.15192

Benedicto, E. (2016). Kirtan Kriya Meditation on Stress and Alzheimer's Disease. *Integrative Medicine Alert, 19*(1).

Black, D. S., O'Reilly, G. A., Olmstead, R., Breen, E. C., & Irwin, M. R. (2015). Mindfulness Meditation and Improvement in Sleep Quality and Daytime Impairment Among Older Adults With Sleep Disturbances: A Randomised Clinical Trial. *JAMA Internal Medicine, 175*(4), 494-501. doi:10.1001/jamainternmed.2014.8081

Braboszcz, C., Cahn, B. R., Levy, J., Fernandez, M., & Delorme, A. (2017). Increased Gamma Brainwave Amplitude Compared to Control in Three Different Meditation Traditions. *Journal Article, 12*(1). doi:10.1371/journal.pone.0170647

Carmody, J., Baer, R. A., Lykins, E. L. B., & Olendzki, N. (2009). An Empirical Study of the Mechanisms of Mindfulness in a Mindfulness-Based Stress Reduction Program. *Journal of Clinical Psychology, 65*(6), 613-626. doi:10.1002/jclp.20579

Cole, M. B., & Tufano, R. (2008). *Applied theories in occupational therapy: a practical approach*. Thorofare, N.J: SLACK Inc.

Crane, R. S., Soulsby, Judith G., Kuyken, Willem., Mark, J., Williams, G., Eames, Catrin., Bartley, Trish, Cooper, Lucinda, Evans, Alison., Fennell, Melanie J.V., Gold, Eluned, Mardula, Jody., & Silverton, Sarah.,. (Version 2016). Manual of the Minfulness-based Interventions Teaching Assessment Criteria (MBI:TAC). 1-74.

Crane, R. S., Stanley, S., Rooney, M., Bartley, T., Cooper, L., & Mardula, J. (2015). Disciplined Improvisation: Characteristics of Inquiry in Mindfulness-Based Teaching. *Mindfulness, 6*(5), 1104-1114. doi:10.1007/s12671-014-0361-8

Creswell, J. D., Irwin, M. R., Burklund, L. J., Lieberman, M. D., Arevalo, J. M. G., Ma, J., . . . Cole, S. W. (2012). Mindfulness-Based Stress Reduction training reduces loneliness and pro-inflammatory gene expression in older adults: A small randomised controlled trial. *Brain, Behavior, and Immunity, 26*(7), 1095-1101. doi:10.1016/j.bbi.2012.07.006

De Vriendt, P., Gorus, E., Cornelis, E., Velghe, A., Petrovic, M., & Mets, T. (2012). The process of decline in advanced activities of daily living: a qualitative explorative study in mild cognitive impairment. *International Psychogeriatrics, 24*(6), 1-13. doi:10.1017/S1041610211002766

Dhalwani, N. N., Fahami, R., Sathanapally, H., Seidu, S., Davies, M. J., & Khunti, K. (2017). Association between polypharmacy and falls in older adults: a longitudinal study from England. *BMJ Open, 7*(10), e016358. doi:10.1136/bmjopen-2017-016358

Fam, J., Sun, Y., Qi, P., Lau, R. C., Feng, L., Kua, E. H., & Mahendran, R. (2020). Mindfulness practice alters brain connectivity in community-living elders with mild cognitive impairment. *Psychiatry and clinical neurosciences, 74*(4), 257-262. doi:https://dx.doi.org/10.1111/pcn.12972

Fitzpatrick-Lewis, D., Warren, R., Ali, M. U., Sherifali, D., & Raina, P. (2015). Treatment for mild cognitive impairment: a systematic review and meta-analysis. *CMAJ open U6 - - Journal Article, 3*(4), E419.

Fjorback, L. O., Arendt, M., Ørnbøl, E., Fink, P., & Walach, H. (2011). Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy – a systematic review of randomised controlled trials. *Acta Psychiatrica Scandinavica, 124*(2), 102-119. doi:10.1111/j.1600-0447.2011.01704.x

Ford, A. H., & Almeida, O. P. (2017). Management of Depression in Patients with Dementia: Is Pharmacological Treatment Justified? *Drugs & aging*, *34*(2), 89-95. doi:10.1007/s40266-016-0434-6

Foulk, M. A., Ingersoll-Dayton, B., Kavanagh, J., Robinson, E., & Kales, H. C. (2014). Mindfulness-Based Cognitive Therapy With Older Adults: An Exploratory Study. *Journal of Gerontological Social Work, 57*(5), 498-520. doi:10.1080/01634372.2013.869787

Ganguli, M., Jia, Y., Hughes, T. F., Snitz, B. E., Chang, C. H., Berman, S. B., . . . Kamboh, M. I. (2019). Mild Cognitive Impairment that Does Not Progress to Dementia: A Population-Based Study. *Journal of the American Geriatrics Society, 67*(2), 232–238.

Geiger, P. J., Boggero, I. A., Brake, C. A., Caldera, C. A., Combs, H. L., Peters, J. R., & Baer, R. A. (2016). Mindfulness-Based Interventions for Older Adults: a Review of the Effects on Physical and Emotional Well-Being. *Mindfulness, 7*(2), 296-307. doi:10.1007/s12671-015-0444-1

Goodman, V., Wardrope, B., Myers, S., Cohen, S., McCorquodale, L., Kinsella, E. A. (2019). Mindfulness and Human Occupation: A Scoping Review. *Scandinavian journal of occupational therapy, 26*(3), 157–170. doi.org/10.1080/11038128.2018.1483422

Grabovac, A. D., Lau, M. A., & Willett, B. R. (2011). Mechanisms of Mindfulness: A Buddhist Psychological Model. *Mindfulness, 2*(3), 154-166. doi:10.1007/s12671-011-0054-5

Hedman, A., Nygård, L., Malinowsky, C., Almkvist, O., & Kottorp, A. (2016). Changing everyday activities and technology use in mild cognitive impairment. *The British Journal of Occupational Therapy, 79*(2), 111-119. doi:10.1177/0308022615586800

Hedman, A., Kottorp, A., & Nygård, L. (2018). Patterns of everyday technology use and activity involvement in mild cognitive impairment: a five-year follow-up study. *Aging & Mental Health, 22*(5), 603-610. doi:10.1080/13607863.2017.1297361

Henton, P. A.; Gerig, L.; Marihugh, K.; Cameron, L.; Butterweck, M. J.; Swider, J. (2022). Stress, Mindfulness, and Occupational Engagement: A Pilot Study of the Huntington Occupational Mindfulness and Engagement (HOME) Protocol. *The American journal of occupational therapy*, *76*(Supplement_1), 7610510224–7610510224p1. https://doi.org/10.5014/ajot.2022.76S1-PO224

Jekel, K., Damian, M., Wattmo, C., Hausner, L., Bullock, R., Connelly, P. J., . . . Frolich, L. (2015). Mild cognitive impairment and deficits in instrumental activities of daily living: a systematic review. *Alzheimer's Research & Therapy*, *7*(1), 17-17. doi:10.1186/s13195-015-0099-0

Jessen, F., Amariglio, R. E., van Boxtel, M., Breteler, M., Ceccaldi, M., Chételat, G., . . . Subjective Cognitive Decline Initiative Working, G. (2014). A conceptual framework for research on subjective cognitive decline in preclinical Alzheimer's disease. *Alzheimer's & Dementia: The Journal of the Alzheimer's Association, 10*(6), 844-852. Doi:10.1016/j.jalz.2014.01.001

Jessen, F., Amariglio, R. E., Buckley, R. F., van der Flier, W. M., Han, Y., Molinuevo, J. L., Rabin, L., Rentz, D. M., Rodriguez-Gomez, O., Saykin, A. J., Sikkes, S. A. M., Smart, C. M.; Wolfsgruber, S., Wagner, M. (2020). The Characterisation of Subjective Cognitive Decline. *Lancet neurology, 19*(3), 271–278. https://doi.org/10.1016/S1474-4422(19)30368-0.

Johansson, M. M., Marcusson, J., & Wressle, E. (2015). Cognitive impairment and its consequences in everyday life: experiences of people with mild cognitive impairment or mild dementia and their relatives. *International psychogeriatrics / IPA, 27*(6), 949-958. doi:10.1017/S1041610215000058

Joosten-Weyn Banningh, E. W. A., Kessels, R. P. C., Olde Rikkert, M. G. M., Geleijns-Lanting, C. E., & Kraaimaat, F. W. (2008). A cognitive behavioural group therapy for patients diagnosed with mild cognitive impairment and their significant others: feasibility and preliminary results. *Clinical Rehabilitation, 22*(8), 731-740. doi:10.1177/0269215508090774

Joosten-Weyn Banningh, E. W. A., Vernooy-Dassen, M. J. F. J., Olde Rikkert, M. G. M., & Teunisse, J. P. W. M. (2008). Mild cognitive impairment: coping with an uncertain label. *International Journal of Geriatric Psychiatry, 23*(2), 148-154. doi:10.1002/gps.1855

Kabat-Zinn, J., & University of Massachusetts Medical Center/Worcester. Stress Reduction, C. (2009). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness* (Delta trade pbk. reissue, 15th anniversary ed.). New York, N.Y: Delta Trade Paperbacks.

Khoury, B., Sharma, M., Rush, S. E., & Fournier, C. (2015). Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *Journal of psychosomatic research, 78*(6), 519-528. doi:10.1016/j.jpsychores.2015.03.009

Knopman, D. S., & Petersen, R. C. (2014). Mild cognitive impairment and mild dementia: a clinical perspective. *Mayo Clinic proceedings, 89*(10), 1452-1459. doi:10.1016/j.mayocp.2014.06.019

Kok, R. M., & Reynolds, C. F. (2017). Management of Depression in Older Adults: A Review. *JAMA, 317*(20), 2114-2122. doi:10.1001/jama.2017.5706

Kuring, J. K., Mathias, J. L., & Ward, L. (2018). Prevalence of Depression, Anxiety and PTSD in People with Dementia: a Systematic Review and Meta-Analysis. *Neuropsychology Review, 28*(4), 393-416. doi:10.1007/s11065-018-9396-2

Lautenschlager, N. T., Cox, K., & Kurz, A. F. (2010). Physical activity and mild cognitive impairment and Alzheimer's disease. *Current neurology and neuroscience reports, 10*(5), 352. doi:10.1007/s11910-010-0121-7

Levine, A. M. P., Emonds, E. E., Smith, M. A., Rickles, N. M., Kuchel, G. A., Steffens, D. C., Ohlheiser, A., Fortinsky, R. H. (2021). Pharmacist Identification of Medication Therapy Problems Involving Cognition Among Older Adults Followed by a Home-Based Care Team. *Drugs & aging, 38*(2), 157–168. https://doi.org/10.1007/s40266-020-00821-7.

Liew, T. M. Trajectories of Subjective Cognitive Decline, and the Risk of Mild Cognitive Impairment and Dementia. (2020). *Alzheimer's research & therapy, 12*(1), 135–135. https://doi.org/10.1186/s13195-020-00699-y.

Marchant, N. L., Barnhofer, T., Coueron, R., Wirth, M., Lutz, A., Arenaza-Urquijo, E. M., . . . The Medit-Ageing Research, G. (2021). Effects of a Mindfulness-Based Intervention versus Health Self-Management on Subclinical Anxiety in Older Adults with Subjective Cognitive Decline: The SCD-Well Randomised Superiority Trial. *Psychotherapy and Psychosomatics, 90*(5), 341-350. doi:https://dx.doi.org/10.1159/000515669

Metternich, B., Kosch, D., Kriston, L., Härter, M., & Hüll, M. (2009). The Effects of Nonpharmacological Interventions on Subjective Memory Complaints: A Systematic Review and Meta-Analysis. *Psychotherapy and Psychosomatics, 79*(1), 6-19. doi:10.1159/000254901

Moniz-Cook, E. (2011). Psychosocial interventions through memory clinics. *Nursing & Residential Care, 13*(4), 189-192.

Nagaoka, M., Hashimoto, Z., Takeuchi, H., & Sado, M. (2021). Effectiveness of mindfulness-based interventions for people with dementia and mild cognitive impairment: A meta-analysis and implications for future research. *PloS one*, *16*(8), e0255128. doi:https://dx.doi.org/10.1371/journal.pone.0255128

Nygård, L., Pantzar, M., Uppgard, B., & Kottorp, A. (2012). Detection of activity limitations in older adults with MCI or Alzheimer's disease through evaluation of perceived difficulty in use of everyday technology: A replication study. *Aging & Mental Health, 16*(3), 361-371. doi:10.1080/13607863.2011.605055

Perini, G., Ramusino, M., Sinforiani, E., Bernini, S., Petrachi, R., Costa, A. (2019). Cognitive Impairment in Depression: Recent Advances and Novel Treatments. *Neuropsychiatric disease and treatment*, *15,* 1249–1258. https://doi.org/10.2147/NDT.S199746

Petersen, R. C., Caracciolo, B., Brayne, C., Gauthier, S., Jelic, V., Fratiglioni, L., . . . Stressforskningsinstitutet. (2014). Mild cognitive impairment: a concept in evolution. *Journal of Internal Medicine*, *275*(3), 214-228. doi:10.1111/joim.12190

Quach, L. T., Ward, R. E., Pedersen, M. M., Leveille, S. G., Grande, L., Gagnon, D. R., & Bean, J. F. (2019). The Association Between Social Engagement, Mild Cognitive Impairment, and Falls Among Older Primary Care Patients. *Archives of physical medicine and rehabilitation*, *100*(8), 1499-1505. doi:10.1016/j.apmr.2019.01.020

Rabin, L. A., Smart, C. M., Crane, P. K., Amariglio, R. E., Berman, L. M., Boada, M., . . . Sikkes, S. A. M. (2015). Subjective Cognitive Decline in Older Adults: An Overview of

Self-Report Measures Used Across 19 International Research Studies. *Journal of Alzheimer's Disease, 48*, S63-S86.

Regan, B., & Varanelli, L. (2013). Adjustment, depression, and anxiety in mild cognitive impairment and early dementia: a systematic review of psychological intervention studies. *International psychogeriatrics / IPA, 25*(12), 1963. doi:10.1017/S104161021300152X

Reichstadt, J., Sengupta, G., Depp, C. A., Palinkas, L. A., & Jeste, D. V. (2010). Older Adults' Perspectives on Successful Aging: Qualitative Interviews. *The American Journal of Geriatric Psychiatry, 18*(7), 567-575. doi:10.1097/JGP.0b013e3181e040bb

Reid, L. M., & MacLullich, A. M. J. (2006). Subjective Memory Complaints and Cognitive Impairment in Older People. *Dementia and Geriatric Cognitive Disorders, 22*(5-6), 471-485. doi:10.1159/000096295

Reppermund, S., Sachdev, P. S., Crawford, J., Kochan, N. A., Slavin, M. J., Kang, K., . . . Brodaty, H. (2011). The relationship of neuropsychological function to instrumental activities of daily living in mild cognitive impairment. *International Journal of Geriatric Psychiatry, 26*(8), 843-852. doi:10.1002/gps.2612

Schlieter, J. (2017). Buddhist insight meditation (Vipassanā) and Jon Kabat-Zinn's "Mindfulness-based Stress Reduction": an example of dedifferentiation of religion and medicine? *Journal of Contemporary Religion, 32*(3), 447. doi:10.1080/13537903.2017.1362884

Schmidtke, K., & Hermeneit, S. (2008). High rate of conversion to Alzheimer's disease in a cohort of amnestic MCI patients. *International Psychogeriatrics, 20*(1), 96-108. doi:10.1017/S1041610207005509

Shigemizu, D., Akiyama, S., Higaki, S., Sugimoto, T., Sakurai, T., Boroevich, K. A., . . . Ozaki, K. (2020). Prognosis prediction model for conversion from mild cognitive impairment to Alzheimer's disease created by integrative analysis of multi-omics data. *Alzheimer's Research & Therapy, 12*(1), 145-145. doi:10.1186/s13195-020-00716-0

Shim, M., Tilley, J. L., Im, S., Price, K., & Gonzalez, A. (2021). A Systematic Review of Mindfulness-Based Interventions for Patients with Mild Cognitive Impairment or Dementia and Caregivers. *Journal of geriatric psychiatry and neurology, 34*(6), 528-554. doi:https://dx.doi.org/10.1177/0891988720957104

Smart, C. M., Segalowitz, S. J., Mulligan, B. P., Koudys, J., & Gawryluk, J. R. (2016). Mindfulness Training for Older Adults with Subjective Cognitive Decline: Results from a Pilot Randomised Controlled Trial. *Journal of Alzheimer's disease 52*(2), 757.

Smoski, M. J., McClintock, A., & Keeling, L. (2016). Mindfulness Training for Emotional and Cognitive Health in Late Life. *Current Behavioral Neuroscience Reports, 3*(4), 301-307. doi:10.1007/s40473-016-0097-y

Sohrabi, H. R., Bates, K. A., Rodrigues, M., Taddei, K., Martins, G., Laws, S. M., . . . Martins, R. N. (2009). The relationship between memory complaints, perceived quality of life and mental health in apolipoprotein Eepsilon4 carriers and non-carriers. *Journal of Alzheimer's disease : JAD, 17*(1), 69.

Splevins, K., Smith, A., & Simpson, J. (2009). Do improvements in emotional distress correlate with becoming more mindful? A study of older adults. *Aging & Mental Health, 13*(3), 328-335. doi:10.1080/13607860802459807

Tomaszewski, F., S., Giovannetti, T., Payne, B., Marsiske, M., Rebok, G., Schaie, K., . . . Gross, A. (2018). Self-perceived Difficulties in Everyday Function Precede Cognitive Decline among Older Adults in the ACTIVE Study. Journal of the International Neuropsychological Society, 24(1), 104-112. doi:10.1017/S1355617717000546

Townsend, E. (2002). *Enabling occupation: an occupational therapy perspective* (Rev. ed. ed.). Ottawa: Canadian Association of Occupational Therapists.

Townsend, E. A., & Polatajko, H. J. (2013). *Enabling occupation II : advancing an occupational therapy vision for health, well-being and justice through occupation*. Ottawa: Canadian Association of Occupational Therapists.

Tran, T., Donnelly, C., Nalder, E. J., Trothen, T., & Finlayson, M. (2020). Occupational therapist-led mindfulness-based stress reduction for older adults living with subjective cognitive decline or mild cognitive impairment in primary care: a feasibility randomised control trial protocol. *BMJ Open, 10*(6), e035299. doi:10.1136/bmjopen-2019-035299

Wahbeh, H., Goodrich, E., & Oken, B. S. (2016). Internet-based Mindfulness Meditation for Cognition and Mood in Older Adults: A Pilot Study. *Alternative therapies in health and medicine, 22*(2), 44.

Wang, X.-T., Wang, Z.-T., Hu, H.-Y., Qu, Y., Wang, M., Shen, X.-N., Xu, W., Dong, Q., Tan, L., & Yu, J.-T. (2021). Association of Subjective Cognitive Decline with Risk of Cognitive Impairment and Dementia: A Systematic Review and Meta-Analysis of Prospective Longitudinal Studies. *The Journal of Prevention of Alzheimer's Disease, 8*(3), 277–285. https://doi.org/10.14283/jpad.2021.27

Wettstein, M., Seidl, U., Wahl, H.-W., Shoval, N., & Heinik, J. (2014). Behavioral Competence and Emotional Well-Being of Older Adults with Mild Cognitive Impairment: Comparison with Cognitively Healthy Controls and Individuals with Early-Stage Dementia. *GeroPsych, 27*(2), 55-65.

Wilson, J. (2014). *Mindful America: meditation and the mutual transformation of Buddhism and American culture*. New York: Oxford University Press.

Woo, B. K. (2017). Dementia Health Promotion for Chinese Americans. *Cureus, 9*(6), e1411. doi:10.7759/cureus.1411

Zhu, X., Song, H., Chang, R., Chen, B., Song, Y., Liu, J., Wang, K. (2021). Combining Compensatory Cognitive Training and Medication Self-Management Skills Training, in Inpatients with Schizophrenia: A Three-Arm Parallel, Single-Blind, Randomized Controlled Trial. *General hospital psychiatry*, *69*, 94–103. https://doi.org/10.1016/j.genhosppsych.2020.12.012.

Zuniga, K. E., Mackenzie, M. J., Kramer, A., & McAuley, E. (2016). Subjective memory impairment and well-being in community-dwelling older adults. *Psychogeriatrics, 16*(1), 20-26. doi:10.1111/psyg.12112

Chapter 2: Literature Review

This section will review four key bodies of literature that support the dissertation's central topic, which include: (1) Primary care teams and the role of occupational therapy among community-dwelling older adults with subjective cognitive decline (SCD) or mild cognitive impairment (MCI); (2) Mindfulness and healthy older adults, with a focus on the implications of mindfulness training on (i) *psychological* and (ii) *cognitive outcomes*; (3) Mindfulness and older adults with SCD, MCI and dementia, with a focus on the implications of mindfulness training on (i) *psychological* and *cognitive outcomes*, (ii) *self-reported everyday functioning (iADLs and ADLs)*, and (iii) *occupational therapy*; and (4) Mindfulness and technology-based applications for older adults in primary care.

Primary Care Teams and the Role of Occupational Therapy Among Community-Dwelling Older Adults with SCD or MCI

In Canada, the vision of primary care is a patient medical home (PMH), a model in which family physicians and other health care professionals work together to meet the health care needs of the broader population as one of its core foundations (College of Family Physicians of Canada, 2019). Some examples of these models in Canada include Family Health Teams in Ontario and Community Health Centres. Family Health Teams were developed to address complex chronic disease management for both the general and aging populations. Family Health Teams consist of family physicians and interprofessional health care providers that may include social workers, occupational therapists, physiotherapists, pharmacists and dieticians, all of whom work together to provide comprehensive primary care (Health Quality Ontario, 2012). Since the COVID-19 pandemic primary care has been in crisis, with challenges accessing primary care providers. Primary care teams have been recommended as a key strategy to not only increase access to primary care, but to address the increasing complexity seen in primary care and supporting the aging Canadian population (Lukey et al., 2021; Newton, 2023; Somé et al., 2020; Szafran et al., 2018).

Primary care is often the first point of contact for individuals and their families who are concerned about cognitive complaints. In primary care, the burden of cognitive complaints falls largely on family physicians (Mitchell, Meader, & Pentzek, 2011). However, the literature noted that primary care physicians lack confidence in their diagnostic skills and believe that diagnosis of MCI requires specialist consultation (Connolly et al., 2011; Lee et al., 2014). As such, a team-based approach has been found to be essential to support this older adult population who are experiencing early cognitive deficits, and their families (Hum et al., 2014). Doing so, would provide comprehensive team-based care to meet the health care needs of this population. Given the breadth of perspectives, primary care teams are well suited to support people living with SCD and MCI.

To further support this older adult population experiencing cognitive deficits, interprofessional Primary Care Collaborative Memory Clinics (PCCMCs) were established in selected FHTs to address the challenges of supporting individuals with cognitive impairments in primary care settings (Lee et al., 2014). PCCMCs were developed to support family physicians in assessing and diagnosing cognitive impairment and providing dementia care by incorporating in an interprofessional biopsychosocial model of assessment (Lee et al., 2014). To date, there are over 120 PCCMCs throughout Ontario, and the evidence suggests that this model is acceptable, feasible, and an effective model for dementia care based on a chronic care model (Lee et al., 2019). In addition, these interprofessional memory clinics or PCCMCs result in high-quality collaborative care and more efficient health service utilization (Lee et al., 2019).

Identifying clinical interventions that could be implemented within team-based models would be advantageous (Lee et al., 2019; Wagner et al., 2017; Winship et al., 2019).

Clinical guidelines for managing cognitive impairment in a primary care setting prioritize non-pharmacological interventions that are appropriate for a patient's cognitive and physical capabilities. The guidelines encourage health practitioners to regularly assess a patient's medical status for risk factors, comorbidities, and functional status. Assessments to examine functional status include assessment of instrumental of activities of daily living (iADLs; e.g. finances, medication, transportation), activities of daily living (ADLs; e.g. self-care activities, mobility), supports at home (e.g. home care, family, case manager, living situation, caregiver burden etc.), and future planning (British Columbia Ministry of Health, 2016).

Occupational therapists are recent additions to primary care settings and are well-positioned within interprofessional primary care teams to provide non-pharmacological approaches. Occupational therapists use their expertise in their understanding of functional and psychosocial needs of community-dwelling older adults living with SCD or MCI (Belchior et al., 2015; Donnelly et al., 2022). Research has shown that the role of primary care-based occupational therapy has focused heavily on supporting older adults within their homes and community (Donnelly et al., 2017). Specifically, the role of occupational therapy in primary care with older adults includes management of chronic diseases (Mirza et al., 2020); health promotion (Cassidy et al., 2017; Johansson & Björklund, 2016; Schepens Niemiec et al., 2018); addressing driving skills (Karia et al., 2016); other services such as assessment of cognition and perception, home safety (Donnelly et al., 2022); and fall prevention (Johansson et al., 2018). Turner (2014) examined the impact of an occupational therapy home assessment within an Ontario Memory Clinic model and found that functional assessment data obtained by occupational therapists were critical in informing the diagnosis and evaluation of dementia. According to Turner (2014, p.1), there is "an emerging and evolving role for evidence-based occupational therapy focused on community-dwelling older adults experiencing cognitive changes" (Turner, 2014). Thus, opportunities to explore the delivery of such occupational therapy-led interventions in the context of a health delivery model such as in primary care, is an essential consideration.

A systematic review by Hunter and Kearney (2018) examined activities and tasks of everyday life such as iADLs among older adults (≥ 65 years of age) with a variety of disabilities in a variety of settings (e.g., community, hospital and long-term care). This study found that occupational therapy-based interventions such as cognitive training, self-management, prevention focused interventions, and home-based multidisciplinary rehabilitation improved iADL performance or slowed decline in iADL performance (Hunter & Kearney, 2018). As older adults age, they are at higher risk of developing chronic co-morbidities, specifically those living with SCD or MCI (Caracciolo et al., 2013; Poblador-Plou et al., 2014). Hunter et al. (2018) highlighted that a self-management program, such as within a health promotion model, can improve activity participation, and self-reported performance and satisfaction with daily activities, including iADLs. Currently, there is limited evidence in the literature on the role of occupational therapists that specifically examine the self-reported functional performance and satisfaction of iADLs with the SCD or MCI population. Therefore, it has been argued that there is a need for more research studies that are well-designed and occupational therapy driven that examine changes in iADL performance and satisfaction with performance, as the result of the intervention among the older adult population (Hunter & Kearney, 2018), including those living with SCD or MCI. Such a study would help to fill a critical knowledge gap in both the literature and clinical practice.

Mindfulness and Healthy Older Adults, Implications on (i) *Psychological* and (ii) *Cognitive Outcomes*

(i) Psychological outcomes

In the past decade, mindfulness-based interventions (MBIs) have increasingly been used with healthy older adults (de Frias & Whyne, 2015; Fiocco & Mallya, 2015). There have been several studies on the impact of MBIs, such as Mindfulness-Based Cognitive Therapy (MBCT) and Mindfulness-Based Stress Reduction (MBSR) among the community based healthy older adults with no cognitive impairment (Geiger et al., 2016; Mallya & Fiocco, 2016). MBCT is an evidence-based program that is a modified version of MBSR and has been shown to be effective in reducing emotional distress (defined as anxiety, depression and perceived stress) in community-dwelling older adults (Splevins et al., 2009). The authors et al. (2009) explored correlations of MBCT with psychological outcomes and reported significant improvements in emotional well-being and mindfulness post-MBCT, with large to moderate effect sizes. Similarly, a study by Young and Baime (2010) examined the impact of MBSR on emotional distress and reported a > 50% reduction in clinically significant depression and anxiety, with moderate effect among the older adult population. As a limitation, neither of these studies had a control group.

There have been a number of systematic reviews on the impact of MBIs in community-dwelling older adults. Geiger et al. (2016) conducted a comprehensive review of 15 MBI studies and reported that MBIs are feasible among healthy older adult population. Additionally, their review found consistent positive effects of MBIs on the emotional well-being of older adults with large effect sizes for psychological outcomes such as anxiety, mood, and stress (Geiger et al., 2016). These findings supported the psychological benefits of MBIs seen in a previous meta-analysis review of MBSR on healthy adults over the age of 18 (Khoury et al., 2015). A recent systematic review and meta-analysis by Li et al. (2019) found MBSR was more effective than wait-list control group in reducing depressive symptoms in older adults immediately following the intervention (Li & Bressington, 2019).

(ii) Cognitive outcomes

From a cognitive perspective, a recent systematic review and meta-analysis by Whitfield et al. (2021) on MBIs reported 56 randomized studies that measured objective cognitive domains and subdomains with adults (≤ 60 years; 40 studies) and older adults (≥ 60 years; 16 studies). They found that a pooled effect across cognitive domains favoured MBIs over control conditions, with a small effect on executive function domains only, among older adults (≥ 60 years; g = 0.15; [0.02, 0.27]). However, the authors noted no other significance on other cognitive domains such as attention, declarative memory or other cognitive aging outcomes (Whitfield et al., 2021). In a scoping review by Hazlett et al. (2019), they found similar results noting improvements in executive functioning but also memory among non-clinical community-dwelling samples of older adults that had received MBSR or MBCT (Hazlett-Stevens et al., 2019). Furthermore, Sevinc et al. (2021) investigated a modified MBSR program that emphasized concentration and focus instead of stress reduction to healthy community-dwelling older adults with mindfulness training (*n* = 74) versus an active cognitive fitness training control group (*n* = 72). They concluded that mindfulness training, such as MBSR, improved cognitive performance in cognitively intact community-dwelling older adults by strengthening connectivity within the default mode network that is associated with memory, which is susceptible to aging affects compared to the control group (Sevinc et al., 2021). These studies support the feasibility of MBSR among non-clinical community-dwelling older adults (Hazlett-

Stevens et al., 2019; Sevinc et al., 2021; Whitfield et al., 2021). However, there is limited large clinical trials with rigorous methodology, and consistent standardized cognitive assessments among studies, are too limited to determine the efficacy of MBIs that is responsible for driving the cognitive outcomes.

Interestingly, there are a number of brain imaging studies that evaluates the effects of mindfulness training on the physiology of the brain among non-clinical community-dwelling older adults (Fayed et al., 2013; Lazar et al., 2005; Luders et al., 2013). A systematic review by Gotink et al. (2016) found that 8-weeks of MBSR training induces functional and structural changes in the brain among the general healthy adult population. These functional and structural brain changes occurred in the areas of pre-frontal cortex, the hippocampus, insula and the cingulate cortex, which are associated with attention regulation, self-referential processing, and perspective taking after participating in the MBSR program (Gotink et al., 2016). These findings indicate that mindfulness practice may have a potential application for adverse factors such as stress, depression and metabolic syndrome associated with cognitive aging that may be clinically useful for the general adult and older adult population from a health service delivery model. However, these clinical finding will need to be further investigated in larger trials (Larouche et al., 2015).

In summary, the literature noted that MBIs such as MBSR may have beneficial clinical applications to support community-dwelling older adults with psychological and cognitive outcomes. Aside from a few studies evaluating the mechanism of MBIs among healthy older adults, to the author's knowledge, there are no current studies that address the utilization of a service delivery model, such as from an IPC perspective (i.e., occupational therapy).

Mindfulness and Older Adults with SCD, MCI and Dementia, Implications on (i) Psychological and cognitive outcomes, (ii) Self-reported everyday functioning (iADLs and ADLs), and (iii) Occupational therapy

(i) Psychological outcomes and cognitive outcomes

Studies examining how MBIs impact cognitive outcomes among older adults, specifically those with cognitive impairment, are starting to emerge (Fam et al., 2020; Marchant et al., 2021). A recent systematic review conducted by Shim et al. (2021) summarized the quality and efficacy of MBIs targeting psychological and cognitive functioning for individuals with MCI or dementia and their caregivers. Based on their review, compared to a control group, older adults with MCI or dementia post MBIs had improvements in (i) neuropsychiatric symptoms, such as mood, QoL, well-being, (ii) cognitive functioning (e.g., attention, memory, executive function and Alzheimer's disease-related cognitive functions) ranging from small to large effect, and (iii) a marker of attention capacity, percent change in brain volume, and resting-state functional connectivity changes based on EEG or *f*MRI (Shim et al., 2021).

In contrast, the effectiveness of MBIs among older adults with MCI and dementia is mixed or inconclusive based on a recent meta-analysis by Nagaoka et al. (2021). Their review identified eight RCTs (n = 276), finding that MBIs had no significant effects on anxiety or depressive symptoms when compared to a control group. Moreover, Nagaoka et al. (2021) reported they could not determine whether MBIs had any effect on cognitive function either short, medium, or long term (Nagaoka et al., 2021). Such mixed or inconclusive results could be due to the studies not targeting specific cognitive conditions (i.e., MCI) but instead variations of cognitive conditions (e.g., MCI and dementia), as there is a wide variation that exists in stages of MCI and dementia which could impact the results. Additionally, mixed or inconclusive results could also be due to the wide variation of MBIs. Further, both of the reviews by Shim et al. (2021) and Nagaoka et al. (2021) did not mention where the majority of participants were recruited from (e.g., the community or from assistive living setting) and within which health service delivery model the MBI was delivered.

(ii) Self-reported everyday functioning (iADLs, ADLs)

The traditional clinical outcome of MBIs is evaluating the two domains of cognitive and psychological functioning. However, MBI studies are starting to look at how mindfulness may impact self-reported everyday functioning among older adults with cognitive impairment. Based on a recent meta-analysis, there were short-term benefits on ADL outcome (but when compared to a control group the quality of evidence was very low) (Nagaoka et al., 2021). Another two small MBI studies measured ADL as their secondary outcome measure, one study with older adults with MCI, and another study with a neurodegenerative condition, Parkinson's disease (Advocat et al., 2016; Wong et al., 2017). Advocat et al. (2016) found a positive improvement in self-reported ADL by the intervention group after six months with a small but significant effect size on an ADL subcategory when compared to a wait-list control group (Advocat et al., 2016). Another study by Wong et al. (2017) reported greater self-reported ADL functioning improvement between Time-1 and Time-3 (59-weeks) for the group that maintained their mindfulness practice above the average length of mindfulness meditation, with a large effect size, compared with the group that practiced below the average duration (Wong et al., 2017). These two studies by Advocat et al. (2016) and Wong et al. (2017) demonstrated promising results and more work is needed to further explore the impact of MBIs on self-reported everyday functioning, which is an important outcome among older adults with SCD or MCI as it may be an indicator of successful aging (Rowe & Kahn, 1997).

(iii) Implications for occupational therapy

Everyday functioning has implications for occupational therapists working with older adults with cognitive deficits. Based on the occupational therapy literature, there are currently no studies examining self-reported everyday functioning as an outcome in MBIs among older adults with cognitive decline. As such, there is an opportunity for occupational therapists to leverage their expertise in this area of clinical practice and research this older adult population with SCD or MCI. Since the aim of maintaining independence and fostering autonomy for community-dwelling older adults with cognitive decline is a public health priority (Hoffman et al., 2020), the need for occupational therapists to evaluate self-reported performance and satisfaction on everyday functioning is critical in both clinical practice and research.

In a recent scoping review, Hoffman et al. (2020) examined MBIs among older adults with dementia and found that the benefits of MBIs could be expanded to occupational therapy practice to support this population. The authors (2020) discussed how MBIs may have functional implications among older adults with dementia by linking the benefits of MBIs to functional abilities such as, (a) sleep quality; (b) fatigue in functional performance; (c) agitated behaviour; and (d) awareness of the disease and medication adherence (Hoffman et al., 2020). This scoping review may be one of the first publications to discuss how MBIs impact functional abilities among older adults with dementia and how they can be expanded to the field of occupational therapy.

Hoffman et al. (2020) noted that none of the MBI studies were delivered by occupational therapists. Similarly, a meta-analysis study by Demarzo et al. (2015) evaluating MBIs with the general adult population recruited from primary care settings found that most professionals delivering MBIs were described as therapists, certified mindfulness teachers, primary researchers and, in one study, a psychiatrist. Furthermore, the authors (2015) noted that professionals providing MBIs also vary in qualifications, training and experience. Of the six analyzed RCTs (*n* = 553), only three trials mentioned the level of therapist training (Demarzo et al., 2015). At the present time, in MBI studies the descriptions of which professionals are providing the intervention, their qualifications and experience is inconsistent. By providing more information about the professionals delivering the intervention, there would be more transparency in this area of emerging field of MBIs research with older adults with SCD or MCI.

Mindfulness in primary care and implications of technology-based applications for older adults

There is a growing body of literature that describes the use of MBIs in primary care settings with the general adult, and healthy older adult, population. Most of these studies have found that MBIs across different populations in primary care led to improvements in psychological functioning such as reduced depression and stress, increased QoL, well-being, positive affect, and meaning of life (Beaulac & Bailly, 2015; Bergen-Cico et al., 2014; Ee et al., 2020; Garland et al., 2019; Schutze et al., 2014). Similarly, a meta-analysis found that MBIs were promising for improving general health, efficacious for improving mental health, and for improving QoL in primary care individuals aged 20 to 80 years (Demarzo et al., 2015).

Studies noted that the advantage of group-based interventions in primary care settings include access (i) to more cost-effective interventions, and (ii) the potential to make evidence-based treatment services more readily available to a larger volume of primary care patients (Craner et al., 2016; Peek et al., 2014; Valentijn et al., 2013). In addition, an occupational therapy-led group model may be a recognized strategy to provide services to a larger number of patients by incorporating values of integrated care in an interprofessional primary care setting (Starfield et al., 2005).

To this writer's knowledge, there are no studies that have specifically evaluated an occupational therapy-led MBIs such as MBSR among older adults with SCD or MCI in a primary care context. Thus, future research on MBIs among older adults with SCD or MCI should examine i.) how an IPC team can deliver MBIs such as MBSR and ii.) the impact of MBSR on self-reported everyday functioning (i.e., iADL) as an outcome would be critical. Doing so would promote independence and to foster autonomy, which are indicators of successful aging.

Mindfulness and Implications of Technology-Based Applications in Primary Care for Older Adults

In recent years, there has been an increased use of technology-based platforms to deliver group-based programs to primary care patients with a variety of mental health conditions. The motivation and incentive to use technology have increased with the COVID-19 pandemic, as in-person visits were not always feasible. Several small studies using MBIs with technology-based applications in primary care have been published that have mental health applications. One study by Castro et al. (2021) found that the highest numbers of program completers and adherence rates were those using information and communication technologies in the mindfulness group for individuals with depression compared to two other active control groups (Castro et al., 2021). In a second study, Segal et al. (2020) found a significant improvement in depression and psychological functional outcomes in an online MBCT, and usual depression care (UDC) group compared to the UDC only group, in a primary care and health behavioural setting (Segal et al., 2020). Third, Reger et al. (2021) found that a common barrier to accessing mental health support among veterans in a primary care and mental health clinic was a lack of awareness of an existing service such as mobile applications (Apps) for mental health support, even though 91% of individuals in the study owned a smartphone (Reger et al., 2021). Lastly, Ainsworth et al. (2021) developed a digital MBI and noted a significant improvement in QoL for primary care individuals with asthma compared to the wait-list control group (Ainsworth et al., 2021).

Since the emergence of technology-based platforms in primary care, such as mobile Apps, there have been limited studies that evaluated the suitability of older adults with SCD or MCI with the use of such technology, and how to use them most efficiently and effectively in primary care. As such, evaluation of mobile health Apps in primary care settings should examine feasibility and acceptability of program delivery and data collection using a rigorous methodology such as an RCT to provide health support for this clinical population would be critical (Mahlo & Windsor, 2021). Further, by evaluating the feasibility and acceptability of using mobile health Apps in primary care settings, would be a valuable contribution to the field of evidence-based digital mobile or App-based technology (e.g., computer tablets and Apps) within a health service delivery model.

Conclusion

This literature review noted a large body of evidence showing that the use of MBIs is suggestive of psychological benefits among the general older adult population, and that these psychological benefits may also apply to those with SCD or MCI. Second, there is evidence of cognitive benefits from participating in MBIs, particularly in the domain of executive functioning among healthy older adult participants. Studies are emerging that examine the impact of MBIs on everyday function (e.g., iADL, ADL) among older adults with cognitive decline. However, the evidence is limited, and further research is needed to establish the feasibility of MBIs for older adults with SCD or MCI, delivered within a primary care context.

Currently, there are several gaps in knowledge across the MBI studies with community-dwelling older adults with SCD or MCI. These gaps include: (i) lack of feasibility evaluation of a clinical intervention that could be implemented within a team-based environment, (ii) research studies that are well-designed and occupational therapy driven that evaluate self-reported performance and satisfaction of everyday function, (iii) research studies that address the utilization of a service delivery model from a patient and health care professional perspective (i.e., occupational therapy), (iv) lack context of the professional delivering the intervention such as qualification, experience including level of training, and last (v) evaluation of acceptability of technology-based platforms (e.g., computer tablet and App) for program delivery and data collection to provide health support including everyday technology among an older clinical population within a primary care context.

References

Advocat, J., Enticott, J., Vandenberg, B., Hassed, C., Hester, J., & Russell, G. (2016). The effects of a mindfulness-based lifestyle program for adults with Parkinson's disease: a mixed methods, wait list controlled randomised control study. *BMC neurology, 16*(1), 166-166. doi:10.1186/s12883-016-0685-1

Ainsworth, B., Stanescu, S., Stuart, B., Russell, D., Liddiard, M., Djukanovic, R., & Thomas, M. (2021). A feasibility trial of a digital mindfulness-based intervention to improve asthma-related quality of life for primary care patients with asthma. *Journal of Behavioral Medicine*. doi:10.1007/s10865-021-00249-3

B.C.Guidelines. (2016). Cognitive Impairment: Recognition, Diagnosis and Management in Primary Care. Retrieved from https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/bc-guidelines/cognitive-impairment

Beaulac, J., & Bailly, M. (2015). Mindfulness-Based Stress Reduction: pilot study of a treatment group for patients with chronic pain in a primary care setting. *Primary Health Care Research & Development, 16*(4), 424-428. doi:10.1017/S1463423614000346

Belchior, P., Korner-Bitensky, N., Holmes, M., & Robert, A. (2015). Identification and assessment of functional performance in mild cognitive impairment: A survey of occupational therapy practices. *Australian Occupational Therapy Journal, 62*(3), 187-196. doi:10.1111/1440-1630.12201

Bergen-Cico, D., Possemato, K., & Pigeon, W. (2014). Reductions in cortisol associated with primary care brief mindfulness program for veterans with PTSD. *Medical care, 52*(12 Suppl 5), S25-31. doi:https://dx.doi.org/10.1097/MLR.0000000000000224

Caracciolo, B., Gatz, M., Xu, W., Marengoni, A., Pedersen, N. L., & Fratiglioni, L. (2013). Relationship of subjective cognitive impairment and cognitive impairment no dementia to chronic disease and multimorbidity in a nation-wide twin study. *Journal of Alzheimer's Disease, 36*(2), 275-284. doi:10.3233/JAD-122050

Cassidy, T. B., Richards, L. G., & Eakman, A. M. (2017). Feasibility of a Lifestyle Redesign ® - Inspired Intervention for Well Older Adults. *The American journal of occupational therapy, 71*(4), 7104190050p7104190051-7104190050p7104190056. doi:10.5014/ajot.2017.024430

Castro, A., García-Palacios, A., López-Del-Hoyo, Y., Mayoral, F., Pérez-Ara, M. Á., Baños, R. M., . . . Gili, M. (2021). Predictors of Adherence in Three Low-Intensity Intervention Programs Applied by ICTs for Depression in Primary Care. *International journal of environmental research and public health, 18*(4), 1774. doi:10.3390/ijerph18041774

College of Family Physicians of Canada. (2019). *A New Vision for Canada: Family Practice - The Patient's Medical Home*. Retrieved from The College of Physicians of Canada:

Connolly, A., Gaehl, E., Martin, H., Morris, J., & Purandare, N. (2011). Underdiagnosis of dementia in primary care: Variations in the observed prevalence and comparisons to the expected prevalence. *Aging & Mental Health, 15*(8), 978-984. doi:10.1080/13607863.2011.596805

Craner, J. R., Sawchuk, C. N., & Smyth, K. T. (2016). Outcomes of a 6-Week Cognitive-Behavioral and Mindfulness Group Intervention in Primary Care. *Families systems & health, 34*(3), 250-259. doi:10.1037/fsh0000202 de Frias, C. M., & Whyne, E. (2015). Stress on health-related quality of life in older adults: the protective nature of mindfulness. *Aging & Mental Health, 19*(3), 201-206. doi:10.1080/13607863.2014.924090

Demarzo, M., Montero-Marin, J., Cuijpers, P., Zabaleta-del-Olmo, E., Mahtani, K. R., Vellinga, A., . . . García-Campayo, J. (2015). The Efficacy of Mindfulness-Based Interventions in Primary Care: A Meta-Analytic Review. *Annals of Family Medicine*, *13*(6), 573-582. doi:10.1370/afm.1863

Donnelly, Leclair, L. L., Hand, C., Wener, P. F., & Letts, L. J. (2022). *Occupational therapy and primary care: a vision for the path forward*. (CAOT).

Donnelly, C., Leclair, L. L., Wener, P. F., Hand, C. L., & Letts, L. J. (2016). Occupational therapy in primary care: Results from a national survey: L'ergothérapie dans les soins primaires : Résultats d'un sondage national. *The Canadian Journal of Occupational Therapy, 83*(3), 135. doi:10.1177/0008417416637186

Donnelly, C., O'Neill, C., Bauer, M., & Letts, L. (2017). Canadian Occupational Performance Measure (COPM) in Primary Care: A Profile of Practice. *The American journal of occupational therapy : official publication of the American Occupational Therapy Association, 71*(6), 7106265010p7106265011-7106265018. doi:10.5014/ajot.2017.020008

Ee, C., de Courten, B., Avard, N., de Manincor, M., Al-Dabbas, M. A., Hao, J., . . . Chang, D. (2020). Shared Medical Appointments and Mindfulness for Type 2 Diabetes—A Mixed-Methods Feasibility Study. *Frontiers in endocrinology (Lausanne), 11*, 570777-570777. doi:10.3389/fendo.2020.570777

Fam, J., Sun, Y., Qi, P., Lau, R. C., Feng, L., Kua, E. H., & Mahendran, R. (2020). Mindfulness practice alters brain connectivity in community-living elders with mild cognitive impairment. *Psychiatry and clinical neurosciences, 74*(4), 257-262. doi:https://dx.doi.org/10.1111/pcn.12972

Fayed, N., Lopez Del Hoyo, Y., Andres, E., Serrano-Blanco, A., Bellon, J., Aguilar, K., . . . Garcia-Campayo, J. (2013). Brain changes in long-term zen meditators using proton magnetic resonance spectroscopy and diffusion tensor imaging: a controlled study. *PloS one, 8*(3), e58476. doi:https://dx.doi.org/10.1371/journal.pone.0058476

Fiocco, A. J., & Mallya, S. (2015). The importance of cultivating mindfulness for cognitive and emotional well-being in late life. *Journal of evidence-based complementary & alternative medicine, 20*(1), 35-40. doi:https://dx.doi.org/10.1177/2156587214553940

Garland, E. L., Atchley, R. M., Hanley, A. W., Zubieta, J.-K., & Froeliger, B. (2019). Mindfulness-Oriented Recovery Enhancement remediates hedonic dysregulation in opioid users: Neural and affective evidence of target engagement. *Science advances, 5*(10), eaax1569. doi:https://dx.doi.org/10.1126/sciadv.aax1569

Geiger, P. J., Boggero, I. A., Brake, C. A., Caldera, C. A., Combs, H. L., Peters, J. R., & Baer, R. A. (2016). Mindfulness-Based Interventions for Older Adults: a Review of the Effects on Physical and Emotional Well-Being. *Mindfulness, 7*(2), 296-307. doi:10.1007/s12671-015-0444-1

Gocan, S., Laplante, M. A., & Woodend, K. (2014). Interprofessional Collaboration in Ontario’s Family Health Teams: A Review of the Literature. *Journal of Research in Interprofessional Practice and Education, 3*(3). doi:10.22230/jripe.2014v3n3a131

Gotink, R. A., Meijboom, R., Vernooij, M. W., Smits, M., & Hunink, M. G. M. (2016). 8-week Mindfulness Based Stress Reduction induces brain changes similar to traditional long-term meditation practice – A systematic review. *Brain and cognition, 108*, 32-41. doi:10.1016/j.bandc.2016.07.001

Hazlett-Stevens, H., Singer, J., & Chong, A. (2019). Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy with Older Adults: A Qualitative Review of Randomised Controlled Outcome Research. *Clinical Gerontologist, 42*(4), 347-358. doi:https://dx.doi.org/10.1080/07317115.2018.1518282

Health Quality Ontario. (2012). Learning community: Advancing Improvement in primary care in Ontario. Retrieved from http://www.hqontario.ca/Portals/0/documents/qi/pc-team-building-guide-intro-en.pdf

Hoffman, L., Hutt, R., Yi Tsui, C. K., Zorokong, K., & Marfeo, E. (2020). Meditation-Based Interventions for Adults With Dementia: A Scoping Review. *The American journal of occupational therapy : official publication of the American Occupational Therapy Association, 74*(3), 7403205010p7403205011-7403205010p7403205014. doi:https://dx.doi.org/10.5014/ajot.2020.037820

Hum, S., Cohen, C., Persaud, M., Lee, J., Drummond, N., Dalziel, W., & Pimlott, N. (2014). Role expectations in dementia care among family physicians and specialists. *Canadian geriatrics journal : CGJ, 17*(3), 95.

Hunter, E. G., & Kearney, P. J. (2018). Occupational Therapy Interventions to Improve Performance of Instrumental Activities of Daily Living for Community-Dwelling Older Adults: A Systematic Review. *The American journal of occupational therapy : official* *publication of the American Occupational Therapy Association, 72*(4), 7204190050p7204190051-7204190057. doi:10.5014/ajot.2018.031062

Johansson, A., & Björklund, A. (2016). The impact of occupational therapy and lifestyle interventions on older persons' health, well-being, and occupational adaptation: A mixed-design study. *Scandinavian Journal of Occupational Therapy, 23*(3), 207-219. doi:10.3109/11038128.2015.1093544

Johansson, E., Jonsson, H., Dahlberg, R., & Patomella, A.-H. (2018). The efficacy of a multifactorial falls-prevention programme, implemented in primary health care. *The British Journal of Occupational Therapy, 81*(8), 474-481. doi:10.1177/0308022618756303

Karia, P., Davis, J., Kerby, A., Gonzalez, A., Smith, C., & Mezher, R. (2016). Importance of Addressing Driving with Older Adults in Primary Care and the Role of Occupational Therapy. *Journal of the American Geriatrics Society (JAGS), 64*(9), e58-e59. doi:10.1111/jgs.14240

Khoury, B., Sharma, M., Rush, S. E., & Fournier, C. (2015). Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *Journal of psychosomatic research, 78*(6), 519-528. doi:10.1016/j.jpsychores.2015.03.009

Larouche, E., Hudon, C., & Goulet, S. (2015). Potential benefits of mindfulness-based interventions in mild cognitive impairment and Alzheimer's disease: An interdisciplinary perspective. *Behavioural Brain Research, 276*(Supplement C), 199-212. doi:https://doi.org/10.1016/j.bbr.2014.05.058

Lazar, S. W., Kerr, C. E., Wasserman, R. H., Gray, J. R., Greve, D. N., Treadway, M. T., . . . Fischl, B. (2005). Meditation experience is associated with increased cortical thickness. *NeuroReport, 16*(17), 1893-1897. doi:10.1097/01.wnr.0000186598.66243.19

Lee, L., Hillier, L. M., & Gregg, S. (2019). Partnerships for improving dementia care in primary care: Extending access to primary care-based memory clinics in Ontario, Canada. *Health & social care in the community, 27*(6), 1574-1585. doi:10.1111/hsc.12829

Lee, L., Hillier, L. M., Heckman, G., & Gagnon, M. (2014). Primary Care-Based Memory Clinics: Expanding Capacity for Dementia Care. *Canadian Journal on Aging, 33*(3), 307-319. doi:10.1017/S0714980814000233

Lee, L., Hillier, L. M., Locklin, J., Lumley-Leger, K., & Molnar, F. (2019). Specialist and family physician collaboration: Insights from primary care-based memory clinics. *Health & social care in the community, 27*(4), e522-e533. doi:10.1111/hsc.12751

Li, S. Y. H., & Bressington, D. (2019). The effects of mindfulness-based stress reduction on depression, anxiety, and stress in older adults: A systematic review and meta-analysis. *International journal of mental health nursing, 28*(3), 635-656. doi:10.1111/inm.12568

Lukey, A., Johnston, S., Montesanti, S., Donnelly, C., Wankah, P., Breton, M., Gaboury, I., Parniak, S., Pritchard, C., Berg, S., Maiwald, K., Mallinson, S., Green, L. A., & Oelke, N. D. (2021). Facilitating Integration Through Team-Based Primary Healthcare: A Cross-Case Policy Analysis of Four Canadian Provinces. *International Journal of Integrated Care*, 21(4), 12–12. https://doi.org/10.5334/ijic.5680

Luders, E., Thompson, P. M., Kurth, F., Hong, J.-Y., Phillips, O. R., Wang, Y., . . . Toga, A. W. (2013). Global and regional alterations of hippocampal anatomy in long-term meditation practitioners. *Human brain mapping, 34*(12), 3369-3375. doi:https://dx.doi.org/10.1002/hbm.22153

Mahlo, L., & Windsor, T. D. (2021). Feasibility, Acceptability, and Preliminary Efficacy of an App-Based Mindfulness-Meditation Program Among Older Adults. *Gerontologist, 61*(5), 775-786. doi:10.1093/geront/gnaa093

Mallya, S., & Fiocco, A. J. (2016). Effects of Mindfulness Training on Cognition and Well-Being in Healthy Older Adults. *Mindfulness, 7*(2), 453-465. doi:10.1007/s12671-015-0468-6

Marchant, N. L., Barnhofer, T., Coueron, R., Wirth, M., Lutz, A., Arenaza-Urquijo, E. M., . . . The Medit-Ageing Research, G. (2021). Effects of a Mindfulness-Based Intervention versus Health Self-Management on Subclinical Anxiety in Older Adults with Subjective Cognitive Decline: The SCD-Well Randomised Superiority Trial. *Psychotherapy and Psychosomatics, 90*(5), 341-350. doi:https://dx.doi.org/10.1159/000515669

Mirza, M., Gecht-Silver, M., Keating, E., Krischer, A., Kim, H., & Kottorp, A. (2020). Feasibility and Preliminary Efficacy of an Occupational Therapy Intervention for Older Adults With Chronic Conditions in a Primary Care Clinic. *The American journal of occupational therapy, 74*(5), 7405205030-7405205030p7405205013. doi:10.5014/ajot.2020.039842

Mitchell, A. J., Meader, N., & Pentzek, M. (2011). Clinical recognition of dementia and cognitive impairment in primary care: a meta-analysis of physician accuracy. *Acta Psychiatrica Scandinavica, 124*(3), 165-183. doi:10.1111/j.1600-0447.2011.01730.x

Nagaoka, M., Hashimoto, Z., Takeuchi, H., & Sado, M. (2021). Effectiveness of mindfulness-based interventions for people with dementia and mild cognitive impairment: A meta-analysis and implications for future research. *PloS one*, *16*(8), e0255128. doi:https://dx.doi.org/10.1371/journal.pone.0255128

Newton, C. (2023). It is time to invest in team-based care. *Canadian Family Physician*, 69(2), 143–143. https://doi.org/10.46747/cfp.6902143

Peek, C. J., Cohen, D. J., & deGruy, F. V. (2014). Research and Evaluation in the Transformation of Primary Care. *The American psychologist, 69*(4), 430-442. doi:10.1037/a0036223

Poblador-Plou, B., Calderón-Larrañaga, A., Marta-Moreno, J., Hancco-Saavedra, J., Sicras-Mainar, A., Soljak, M., & Prados-Torres, A. (2014). Comorbidity of dementia: a cross-sectional study of primary care older patients. *BMC psychiatry, 14*(1), 84-84. doi:10.1186/1471-244X-14-84

Reger, G. M., Harned, M., Stevens, E. S., Porter, S., Nguyen, J., & Norr, A. M. (2021). Mobile applications may be the future of veteran mental health support but do veterans know yet? A survey of app knowledge and use. *Psychological services*. doi:10.1037/ser0000562

Rowe, J. W., & Kahn, R. L. (1997). Successful aging. *The Gerontologist, 37*(4), 433-440. doi:10.1093/geront/37.4.433

Schepens Niemiec, S. L., Blanchard, J., Vigen, C. L. P., Martínez, J., Guzmán, L., Concha, A., . . . Carlson, M. (2018). Evaluation of ¡Vivir Mi Vida! to improve health and wellness of rural-dwelling, late middle-aged Latino adults: results of a feasibility and pilot study of a lifestyle intervention. *Primary Health Care Research & Development, 19*(5), 448-463. doi:10.1017/S1463423617000901

Schutze, R., Slater, H., O'Sullivan, P., Thornton, J., Finlay-Jones, A., & Rees, C. S. (2014). Mindfulness-Based Functional Therapy: a preliminary open trial of an integrated model of care for people with persistent low back pain. *Frontiers in Psychology, 5*, 839. doi:https://dx.doi.org/10.3389/fpsyg.2014.00839

Segal, Z. V., Dimidjian, S., Beck, A., Boggs, J. M., Vanderkruik, R., Metcalf, C. A., . . . Levy, J. (2020). Outcomes of Online Mindfulness-Based Cognitive Therapy for Patients With Residual Depressive Symptoms: A Randomised Clinical Trial. *JAMA psychiatry (Chicago, Ill.), 77*(6), 563-573. doi:10.1001/jamapsychiatry.2019.4693

Sevinc, G., Rusche, J., Wong, B., Datta, T., Kaufman, R., Gutz, S. E., . . . Lazar, S. W. (2021). Mindfulness Training Improves Cognition and Strengthens Intrinsic Connectivity Between the Hippocampus and Posteromedial Cortex in Healthy Older Adults. *Frontiers in Aging Neuroscience, 13*, 702796. doi:https://dx.doi.org/10.3389/fnagi.2021.702796

Shim, M., Tilley, J. L., Im, S., Price, K., & Gonzalez, A. (2021). A Systematic Review of Mindfulness-Based Interventions for Patients with Mild Cognitive Impairment or Dementia and Caregivers. *Journal of geriatric psychiatry and neurology, 34*(6), 528-554. doi:https://dx.doi.org/10.1177/0891988720957104

Somé, N. H., Devlin, R. A., Mehta, N., Zaric, G. S., & Sarma, S. (2020). Team-based primary care practice and physician's services: Evidence from Family Health Teams in Ontario, Canada. *Social Science & Medicine*, 264, 113310–113310. https://doi.org/10.1016/j.socscimed.2020.113310

Splevins, K., Smith, A., & Simpson, J. (2009). Do improvements in emotional distress correlate with becoming more mindful? A study of older adults. *Aging & Mental Health, 13*(3), 328-335. doi:10.1080/13607860802459807

Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of Primary Care to Health Systems and Health. *The Milbank Quarterly, 83*(3), 457-502. doi:10.1111/j.1468-0009.2005.00409.x

Szafran, O., Kennett, S. L., Bell, N. R., Green, L. (2018). Patients' perceptions of team-based care in family practice: access, benefits and team roles. *Journal of Primary Health Care 10*(3) 248-257 https://doi.org/10.1071/HC18018

Turner, L. (2014). *Occupational Performance and MCI in a Primary Care Memory Clinic.* (Master's). McMaster University, Hamilton. Retrieved from http://hdl.handle.net/11375/16152

Valentijn, P. P., Schepman, S. M., Opheij, W., & Bruinzeels, R. H. (2013). Understanding integrated care: A comprehensive conceptual framework based on the integrative functions of primary care. *International journal of integrated care, 13*(1), e010-e010. doi:10.5334/ijic.886

Wagner, E. H., Flinter, M., Hsu, C., Cromp, D., Austin, B. T., Etz, R., . . . Ladden, M. D. (2017). Effective team-based primary care: observations from innovative practices. *BMC family practice, 18*(1), 1-9. doi:10.1186/s12875-017-0590-8

Whitfield, T., Barnhofer, T., Acabchuk, R., Cohen, A., Lee, M., Schlosser, M., . . . Marchant, N. L. (2021). The Effect of Mindfulness-based Programs on Cognitive Function in Adults: A Systematic Review and Meta-analysis. *Neuropsychology Review*. doi:https://dx.doi.org/10.1007/s11065-021-09519-y

Winship, J. M., Ivey, C. K., & Etz, R. S. (2019). Opportunities for occupational therapy on a primary care team. *The American journal of occupational therapy, 73*(5), 7305185010-p7305185010. doi:10.5014/ajot.2019.030841

Wong, W. P., Coles, J., Chambers, R., Wu, D. B.-C., & Hassed, C. (2017). The Effects of Mindfulness on Older Adults with Mild Cognitive Impairment. *JAD reports*, *1*(1), 181-193. doi:10.3233/ADR-170031

Young, L. A., & Baime, M. J. (2010). Mindfulness-Based Stress Reduction: Effect on Emotional Distress in Older Adults. *Complementary Health Practice Review*, *15*(2), 59-64. doi:10.1177/1533210110387687

Chapter 3- An occupational therapist-led Mindfulness-Based Stress Reduction for older adults living with subjective cognitive decline or mild cognitive impairment in primary care: A feasibility randomized control trial protocol

Citation: Tran, T., Donnelly, C., Nalder, E., Trothen, T., Finlayson, M. (2020). Occupational therapist-led mindfulness-based stress reduction for older adults living with subjective cognitive decline or mild cognitive impairment in primary care: A feasibility randomized control trial protocol. BMJ Open 2020; 10:e035299. doi:10.1136/ bmjopen-2019-035299 (Published)

Abstract

Introduction: Community-dwelling older adults living with subjective cognitive decline (SCD) or mild cognitive impairment (MCI) may experience decreased efficiency in their overall functional performance. This decreased cognitive efficiency may result in anxiety, low mood, perceived stress, and decreased emotional well-being and quality-of-life. These psychological symptoms may further exacerbate cognitive decline.

Exploring non-pharmacological interventions such as mindfulness within primary care is vital in enabling individuals to develop strategies to manage cognitive impairment or psychological symptoms. Mindfulness-Based Stress Reduction (MBSR) is a 9-week program that is beneficial in alleviating psychological symptoms; however, its impact on perceived satisfaction on overall functional performance with this population has not been evaluated. The primary objective of this study is to explore the feasibility of conducting an RCT of an occupational therapist-led MBSR program within primary care.

Methods: Convergent mixed-methods, randomized control feasibility trial with 30 plus participants from an interprofessional primary care team in Toronto, Ontario. Participants are randomized into the 9-week MBSR group or wait-list control will be compared at baseline, post-intervention and four-weeks follow-up. The primary aim is to determine the feasibility of the intervention with this population and setting. The secondary aim is to examine perceived satisfaction with functional performance as measured by the Canadian Occupational Performance Measure (COPM). Secondary clinical outcomes include psychological symptoms.

Analysis: Investigators will analyze the quantitative and qualitative data strands separately. Descriptive statistics, focus group and interviews will then be merged and further analyzed to best understand the feasibility and preliminary clinical outcomes from the study.

Ethics and dissemination: The study is approved by Women's College Hospital (2017-0056-E), and Queen's University, Kingston, Ontario (6026418). This study is registered at Clinicaltrials.gov (NCT03867474). The study will follow Standard Protocol Items: Recommendations for Interventional Trials. The results will be published in peer-reviewed academic journals and disseminated to patient organizations and media.

Strength and Limitations of this Study

- The study will provide valuable data on feasibility and clinical outcomes to determine whether occupational therapist-led MBSR is appropriate for a larger clinical trial
- The first study to use the COPM to evaluate perceived satisfaction on functional performance with community-dwelling older individuals living with SCD or MCI within an interprofessional primary care context
- The only study to explore the qualitative perspective of both participants and health care providers in terms of barriers, enablers and facilitators of implementing and delivering the MBSR program within a primary care setting
- The study is innovative in exploring the acceptability of a tablet computer as a method of intervention delivery and data collection with this population
- The lack of an attention control comparison group and the small sample size is a study limitation

Introduction

By 2036, approximately one-in-four Canadians will be 65 years and over (Canada Year Book, 2011), and an estimated one-third of community-dwelling older adults will experience memory complaints (Zuniga et al., 2016). The earliest sign of memory impairment is subjective cognitive decline (SCD), a self-experienced persistent decline in cognitive capacity, compared with a previously cognitive status and normal performance on standardized cognitive tests used to classify MCI, adjusted for age, sex and education (Jessen et al., 2020). If SCD is to decline further, the next stage is mild cognitive impairment (MCI), with 10 - 20% of older adults developing MCI by age 65 (Langa & Levine, 2014). MCI is clinically characterized as: (i) concern raised by the individual or an informant, or clinician, (ii) cognitive impairment in one or more cognitive domains relative normative data for that individual, and (iii) preservation of functional independence (American Psychiatric & American Psychiatric Association, 2013; Petersen et al., 2014).

There is a large body of evidence that demonstrates that those living with memory complaints face a decline in performance of everyday tasks, most notably in complex instrumental activities-of-daily living (iADLs) (Belchior et al., 2015). These functional changes result in a general sense of decreased satisfaction and discontentment with their overall functional performance (De Vriendt et al., 2012).

Living with SCD or receiving a diagnosis of MCI is usually life-altering and has been found to have a negative impact on an individual's emotional health and well-being (Joosten-Weyn Banningh, Vernooy-Dassen, Olde Rikkert, & Teunisse, 2008), with an increased risk of depression and anxiety disorders (Regan & Varanelli, 2013). There is emerging evidence that supports the use of pharmacologic interventions to improve depressive disorders among those living with cognitive impairment (Perini et al., 2019). However, medications may increase the risk of adverse side-effects, especially for those with multiple comorbidities, including drug complications (Kok & Reynolds, 2017) and falls (Dhalwani et al., 2017). Exploring non-pharmacologic interventions such as behavioural strategies on its own or in parallel with pharmacological interventions to mitigate psychosocial factors and to support functional performance is critical (Moniz-Cook, 2011; Regan & Varanelli, 2013, Zhu et al., 2021). Successful adaptive coping strategies to improve depression and anxiety symptoms in this population are essential to prevent and/or delay further cognitive decline (Regan & Varanelli, 2013).

Evidence from the past 20 years suggests that mindfulness meditation, such as Mindfulness-Based Stress Reduction (MBSR), could benefit those living with SCD and MCI (Smart et al., 2016; Wells et al., 2013). MBSR may be neuroprotective against cognitive decline as it has been found to produce brain changes along with decreased cognitive complaints and increased memory self-efficacy (Smart et al., 2016). Furthermore, a small proof-of-concept study identified that MBSR is feasible with older adults living with MCI and that it may positively affect QoL and well-being (Wells et al., 2013). This study will build on these proof-of-concept and pilot studies as MBSR has demonstrated mental health benefits, including the reduction of emotional distress and worry (Geiger et al., 2016; Smoski et al., 2016).

Other studies have demonstrated that mindfulness helps older adults with loneliness, depression, anxiety, and sleep problems (Black et al., 2015; Creswell et al., 2012; Foulk et al., 2014; Geiger et al., 2016; Splevins et al., 2009) in general community settings and secondary care, e.g., neurology clinics. However, primary care providers are often the first point of contact when older adults and their families are concerned about cognitive problems (Knopman & Petersen, 2014). There is an increasing emphasis on interprofessional primary care teams or patient medical homes to address the challenges of an ageing population. Currently, no studies to date have examined the feasibility of MBSR for those living with SCD or MCI receiving care from interprofessional primary care teams. A growing number of occupational therapists working in primary care teams are ideally positioned to support individuals with SCD and MCI through their expertise in understanding the impact of cognitive impairment on daily function. Examining effective interventions such as an occupational therapist-led, MBSR for individuals at the early stages of cognitive changes is critical to support ageing-in-place (Ciro, 2014).

The overarching purpose is to determine whether occupational therapist-led MBSR in primary care is appropriate for a larger clinical trial in the future. The study has two aims:

Primary Aim:

To explore the feasibility of conducting an RCT of an occupational therapist-led, 9-week MBSR program in an interprofessional primary care setting. The following objectives will assess feasibility outcomes:

1a. Assess participant recruitment, intervention adherence, and study retention (Quantitative)

1b. Explore the acceptability of using tablet computer technology to support intervention, delivery and data collection in the MBSR program (Qualitative)

1c. Explore the perspectives of participants and healthcare providers concerning satisfaction (e.g., the intervention and its’ delivery), perceived value, and barriers and facilitators of implementation of the MBSR program in a primary care setting (Qualitative)

Secondary Aim:

To evaluate the effect sizes of satisfaction on functional performance as a primary clinical outcome and psychological symptoms as secondary clinical outcomes in individuals with SCD or MCI completing a 9-week MBSR program in an interprofessional primary care setting. (Quantitative)

Methods

This study will use a convergent mixed-methods approach in which quantitative and qualitative data are collected in parallel, analyzed separately, and then merge the two data sets to provide a comprehensive analysis to confirm feasibility of a larger future clinical trial. Within this mixed-methods approach, this study will also use a single-blind RCT with two parallel groups and will follow SPIRIT reporting (Chan et al., 2013) guidelines for randomized feasibility trials to further determine effect sizes on clinical outcomes. See Trial Design **(See Figures 1 and 2)**. There will be three assessment time points: Baseline (Time-1) at week-0, on completion of the intervention (Time-2) at week-9, and one-month post-intervention follow-up (Time-3) at week-13.

A convergent mixed-methods design was used to enable both quantitative and qualitative to be collected simultaneously and then integrated to be analyzed to confirm the feasibility of conducting a larger future RCT. The qualitative strand will explore the acceptability of technology and the perceived benefits and satisfaction of the 9-Week MBSR program delivered in a team-based primary care setting.

Figure 3.1
SPIRIT-flow diagram

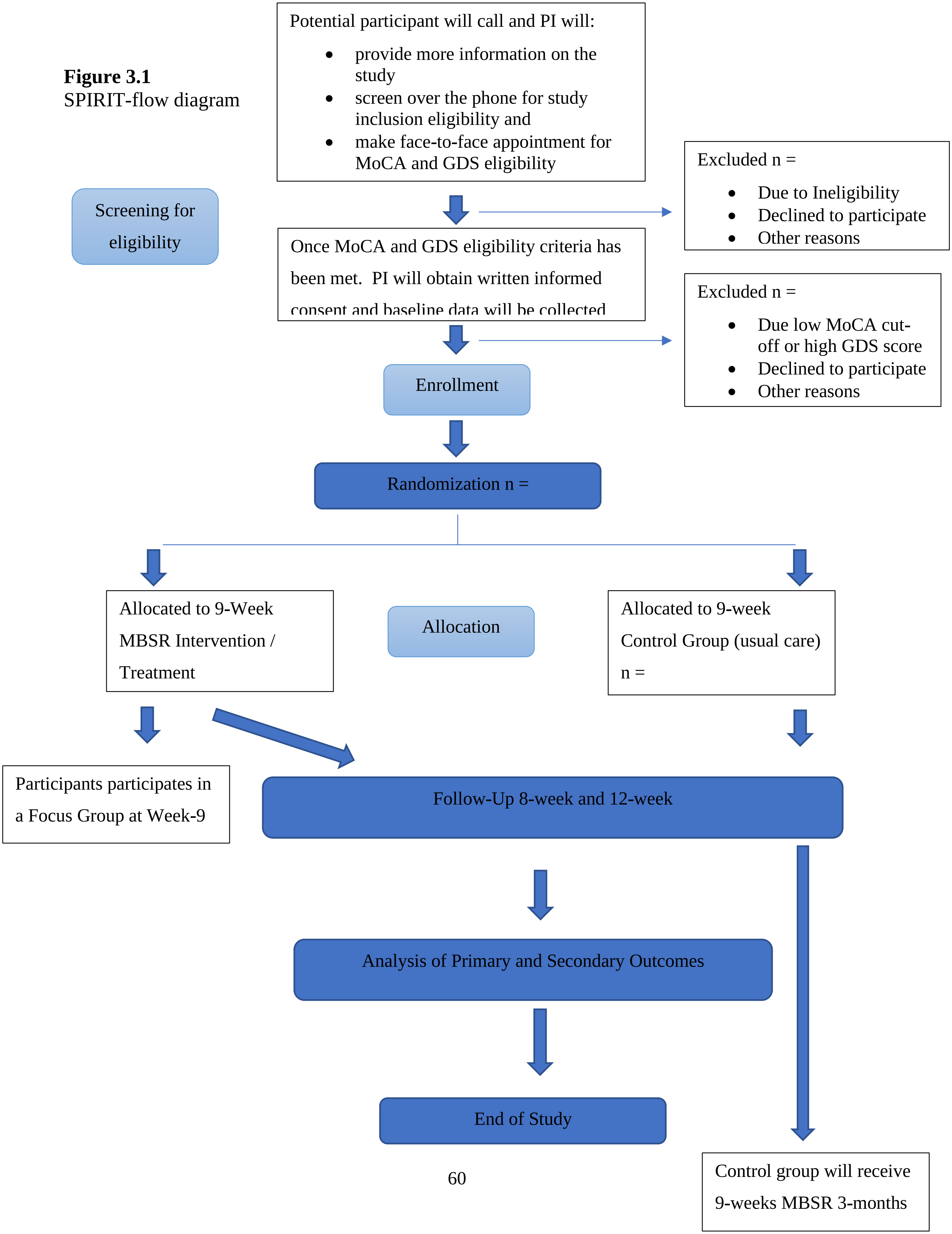
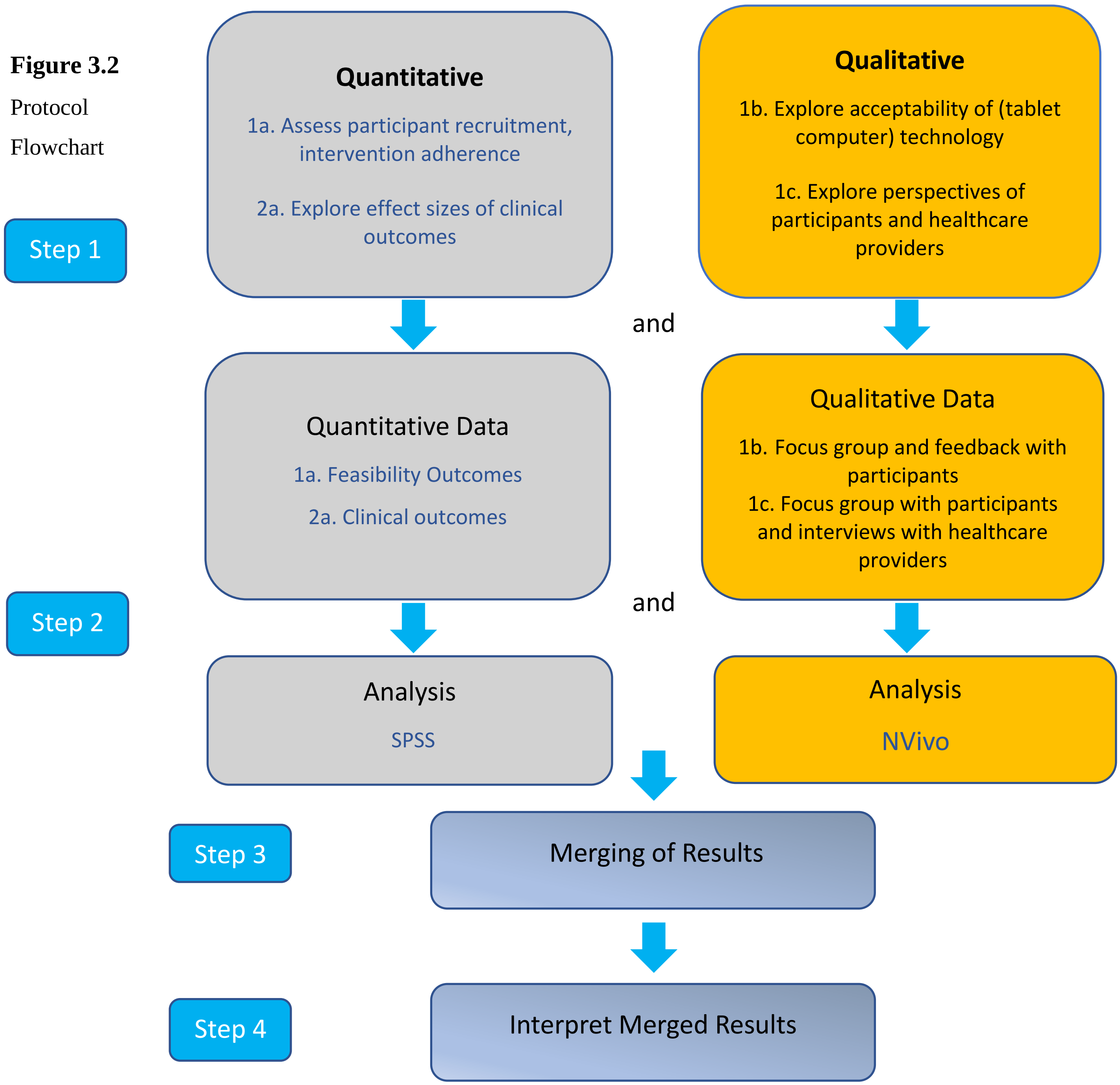


Figure 3.2

Protocol

Flowchart



Study Setting

The study will take place at an interprofessional primary care clinic in the province of Ontario, Canada. Interprofessional team members include occupational therapy, physiotherapy, nursing, pharmacy, social work, and dietetics. There are approximately 18,000 rostered patients with the clinic.

Eligibility Criteria

To qualify for the study, participants will be screened using the Montreal Cognitive Assessment (MoCA), using cut-off scores suggested by Horton et al., (2015) of 20 or greater to rule out severe cognitive deficits, with MoCA scores of ≤ 19 and a Geriatric Depression Scale (GDS) score of 9 or lower to be eligible to participate in the study. Scores of greater than 10 on the GDS and lower than 20 on the MoCA will warrant further assessment with their family physician and will be excluded from the study (Greenberg, 2007; Laudisio et al., 2018; Horton et al., 2015). The inclusion and exclusion criteria are: xx

Inclusion Criteria:

(1) Age ≥ 60 years

(2) English fluency

(3) Living independently (non-assisted living, e.g., retirement or any long-term care facility; self-report)

(4) Have a self-reported SCD or an MCI diagnosis in their chart

(5) Must be a patient with the interprofessional primary care clinic

Exclusion Criteria:

(1) History of prior participation in any MBSR or other mindfulness-based interventions in the past or having 2-3 times per week or more of either mindfulness or yoga practice

(2) Current history of significant medical (e.g., cancer), neurological (e.g., brain injury) or psychiatric condition (e.g., depression with 6 or greater on the GDS), active psychosis, bereavement that significantly impacts on mood, i.e., depression

(3) Active substance use disorder, as self-disclosed in demographic data, women ≥ 11 alcoholic drinks per week, and men ≥ 16 alcoholic drinks per week (Canadian Centre on substance use and addiction, 2018) or other substance use disorder that may lead to impairment in group functioning (as noted in the EMR, or during the face-to-face assessment, or throughout the duration of the study)

(4) Participating in other cognitive or memory training programs in the community or is involved in another research study

(5) Communication barriers (i.e., hearing impairment)

Intervention/Treatment (MBSR) Group

Participants randomized to the intervention arm will participate in an 8-week MBSR program established in 1979 by Kabat-Zinn (Kabat-Zinn & University of Massachusetts Medical Center/Worcester. Stress Reduction, 2009). Four occupational therapists, also Qualified-MBSR teachers, will be involved in the delivery of the intervention group. The traditional MBSR curriculum usually have two teachers, but due to the unique population with cognitive impairment and the use of tablet computers, having two additional MBSR teachers will be beneficial to assist with any issues that may arise, including technological issues or memory challenges. The group will be 3-hours in duration (with a 15-minute break) for 8-weeks, along with an orientation and one all-day retreat. Sessions will consist of: lying down (body scan), sitting (focusing on the breath), and mindful movement (yoga and walking). Daily home practice will be given to be performed for 30 to 45 minutes outside of class.

We will distribute a tablet computer to each participant to access the Application (App), Insight Timer (Timer, 2019), for the duration of the study. Insight Timer contains guided meditation homework practices, with homework accessed by logging directly into Insight Timer. All homework data will be downloaded at the end of the 8-week program. In addition to the App, all participants will be asked to record their home practice using pen and paper weekly logs as a backup provided by the research team. If participants have difficulty with using tablets, additional support will be provided during or after class. If any participant does not have access to Wi-Fi, we will provide them with CDs for ease of adherence for their guided homework practices, and homework will be tracked exclusively using pencil and paper sheets. Similarly, if participants have difficulty with using tablet computers, switching to CDs will be offered as an alternative low technology option.

Monitoring of adherence will include (i) attendance records (ii) home practice logs (iii) tablet computer use (login, frequency, duration) and (iii) field notes from Qualified-MBSR teachers in regards to the level of participation, engagement and group process.

Any participants who experience emotional issues (e.g., increased anxiety, low mood) during the group will be referred to other health-care professionals on the interprofessional primary care team (e.g., social worker, consultant psychiatrists) for psychological support. To determine participant's emotional response, MBSR teachers will observe all participants for any signs of emotional distress (e.g., increased anxiety, low mood) throughout the duration of the study, noting their level of engagement, participation and attendance. If any participant self-report any emotional distress during group interactions, the MBSR teacher will follow-up with the participant after group. Based on the MBSR teacher's clinical judgment, a referral to a mental health-care professional on the primary care team may be activated, if deemed appropriate based on the participant's mental health needs.

The control group (usual care) will be identical to the intervention group and will be offered the MBSR program three months after the intervention group.

Assessment of Intervention (MBSR) Treatment Fidelity

This study will use Gearing et al. (Gearing et al., 2011) four major (intervention) fidelity components: Design, T*raining, Delivery* and *Receipt*. The *design fidelity* of this feasibility RCT is to follow an existing eight-week protocol of MBSR following the authorized curriculum guide from the University of Massachusetts, Medical School, Center for Mindfulness in Medicine, Health Care and Society. Design fidelity will be met by ensuring: a fixed number and length of sessions, following the scripted manual for the course, including external monitoring by the research team recording any protocol deviations based on the population, and monitoring of the home practice logs.

The training fidelity is significant as the teacher's embodiment of mindfulness is central to the participant's learning within the 9-week curriculum. To maintain training fidelity, three facilitators are Qualified-MBSR teachers who have undergone training at the University of Massachusetts, Medical School; one facilitator has equivalent MBSR-qualifications from a different institution in Toronto, Canada using the same standardized MBSR treatment manuals. All qualified-MBSR Teachers have over three years of facilitating MBSR groups. Training fidelity will be met by: teachers meeting regularly to debrief, using the same teachers for the duration of the 8-weeks, and lastly, participant focus group inquiring about the curriculum will be used.

Delivery fidelity is the implementation of the MBSR curriculum by following both the MBSR curriculum protocol from the University of Massachusetts, Medical School and the Mindfulness-Based Interventions Teaching Assessment Criteria (MBI:TAC); a tool that assesses mindfulness-based teaching integrity that will be used as a guide to support the delivery of the MBSR curriculum. Delivery fidelity will also be measured by: participant focus group reflection of the teachers' embodiment of mindfulness practice, attendance, and intervention handouts provided for all participants along with tablet computers or CDs with home practice recordings. Lastly, *receipt fidelity* will be achieved by attendance during the 9-week program, in conjunction with logins and doing the home practices on participant's computer tablets. Additionally, receipt fidelity will be met by: the collection of participant's weekly handwritten home practice log sheets and inquiry discussions during the weekly sessions. This demonstrates that participants are practicing the skills during the study period and are engaged and adherent to the program. However, any missing attendance or drop-outs will be followed-up with a telephone call.

Primary AIM: Feasibility Outcome Measures

As a feasibility study, the overarching purpose is to determine whether MBSR is feasible for a definitive larger clinical trial for community-dwelling older adults living with SCD or MCI in an interprofessional primary care setting.

Objective 1a: Feasibility Measures

i. Recruitment rate: will be defined as feasible for a future study if 30-40 participants are recruited within three to four months (May to August 2019), similar to other feasibility studies (Aguirre et al., 2017).

ii. Retention rate: will be deemed feasible if at least 75-80% of participants complete six or more of the nine sessions as well as a follow-up assessment at T3 based on other feasibility studies.

iii. Adherence rate: will be deemed to have adequate adherence for a future study if participants complete three logins per week and practice homework for at least 1.5 hours per week (duration), which would be deemed moderate adherence rate at 51-79 (Gearing et al., 2011; Perepletchikova & Kazdin, 2005). The treatment adherence rate is determined by the number of sessions completed in full (180 minutes).

Objective 1b: Acceptability of technology

iv. Acceptability of using a tablet computer as a tool for home practice delivery will be determined through. (i) field notes by Qualified-MBSR teachers documenting group participation, (ii) number of participants that switch from computer tablets to low technology for the homework practices during the duration of the 8-weeks, and (iii) focus groups at follow-up at the end of 9-weeks (T2) examining perceived value and benefits of using technology.

Objective 1c: Satisfaction with the MBSR program

v. The overall experience of the 8-week intervention will be evaluated by field notes, mid-way participants surveys, interviews with Qualified-MBSR teachers (T3-week-13) and participant focus groups (T2-week-9). The dimensions of satisfaction with the program will include length (number of weeks), difficulty (e.g. pacing, workload or other challenges), and session duration (e.g. too short, too long).

Secondary AIM: Clinical Outcome Measure*s*

Primary and secondary clinical outcome measures were collected at three different time points by the principal investigator (PI) at Time-1 and by the research assistant at Time-2 and Time-3. Demographic data will be collected at baseline (e.g., age, education, income, physical activity, etc.), similar to other MBSR feasibility studies among older adults with SCD or MCI (Wong et al., 2017; Smart et al., 2016). There is current evidence that suggests that individuals with fewer socio-economic resources are at a higher risk for dementia, thus capturing indicators such as income or wealth, unemployment rates, car and home ownership, and household overcrowding are important risk factors (Klee et al., 2023).

Second, the literature has noted that patients enrolled in Family Health Teams have higher income levels than other primary care models (Glazier et al., 2015). Last, collecting all the demographic information helps to determine if the results are generalizable to other older adult populations with SCD or MCI in different primary care settings. Differing demographic factors such as age, sex, and socio-economic status may conceivably impact the results, which may further contribute to the results of this dissertation. See Appendix F for complete questionnaire.

Quantitative Data

The *primary clinical outcome* will be the average change scores on the perceived satisfaction with functional performance as measured by the *Canadian Occupational Performance Measure (COPM);* (Law & Canadian Association of Occupational, 2005).

Secondary clinical outcomes will include mood, anxiety, perceived stress, mindfulness traits, QoL and acceptance, as shown:

1. Patient Health Questionnaire-9 (PHQ-9); (Kroenke et al., 2001; Phelan et al., 2010)
2. Geriatric Anxiety Inventory (GAI); (Pachana et al., 2007)
3. Perceived Stress Scale (PSS); (Cohen et al., 1983)
4. Cognitive and Affective Mindfulness Scale-Revised (CAMS-R); (Feldman et al., 2007)
5. Quality of Life-Alzheimer's Disease (QoL-AD); (Logsdon et al., 1999)
6. Acceptance and Action Questionnaire (AAQ-II); (Hayes et al., 2004)

Time of Outcome Measures

Outcome measures will be assessed at baseline (Time-1: week-1) on completion of the intervention at (Time-2: week-9) and one-month post-intervention follow-up (Time-3: week-13). See **Table 3.1**

Clinical Outcome Measures

Primary Outcome

Canadian Occupational Performance Measure

The COPM is an individualized, client-centred outcome measure. Through a semi-structured interview, individuals identify areas of difficulty in the performance of everyday activities and satisfaction with their performance. Maximum of five activities can be identified, and each is rated on a 10-point scale for self-perceived performance and satisfaction for their functional performance. COPM demonstrates strong test-retest reliability for both the performance and satisfaction scores when tested a week apart (Carswell et al., 2004) and has demonstrated good responsiveness (Donnelly & Carswell, 2002). A change of at least 3 points or more is recommended to distinguish between older adults who report a clinically significant change compared to those who do not (Tuntland et al., 2016).

Secondary Outcome

Patient Health Questionnaire (PHQ-9)

The PHQ-9 is a self-administered tool that scores each of the 9 DSM-IV criteria as ‘0’ (not at all) to ‘3’ (nearly every day), giving a total score of 27 (Kroenke et al., 2001). PHQ-9 represents a reasonable alternative to the Geriatric Depression Scale with older adults in primary care settings (Kroenke et al., 2001; Phelan et al., 2010). The internal reliability of the PHQ-9 is excellent, with a Cronbach's of 0.89 in a PHQ-9 Primary Care Study, with excellent test-retest reliability. PHQ-9 has a sensitivity of 88% and a specificity of 88% for use in a population with major depression (Kroenke et al., 2001).

Geriatric Anxiety Inventory (GAI)

The GAI consists of 20 ‘Agree/Disagree’ items designed to assess typical common anxiety symptoms for the last week (Pachana et al., 2007). GAI was developed specifically for community-dwelling older adults. The GAI has high internal consistency ($\alpha = .76$), as well as high inter-rater ($r = .89$) and test-retest ($r = .86$) reliability (Pachana et al., 2007).

Perceived Stress Scale (PSS)

PSS is an assessment of the global appraisal of stress (Cohen et al., 1983). The 10-item questionnaire examines stress of respondents using a 4-point scale (0-Never to 4-Very Often). The PSS has acceptable psychometric properties, with satisfactory test-retest reliability criterion assessed at >0.70 (Lee, 2012).

The Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)

CAMS-R is a brief comprehensive measure designed to capture mindfulness based on Jon Kabat-Zinn’s definition of mindfulness (Feldman et al., 2007). The CAMS-R is a 10-item questionnaire with a 4-point scale (1 –Rarely to 4 -Almost Always) s and has demonstrated internal consistency reliability with Cronbach's alpha ranges from 0.61 to 0.81. The CAMS-R has also demonstrated concurrent validity with moderate to large correlation with other measures of mindfulness (r = 0.51 to 0.67) (Feldman et al., 2007).

Quality-of-Life in Alzheimer's Disease (QoL-AD)

The QoL-AD is a 13-item questionnaire covering multiple domains including health, mood, living situation, memory, and money (Logsdon et al., 1999). This questionnaire was selected as it offers domains that are of interest from an occupational therapy perspective (e.g., mood, living situation, money etc.) even though participants did not have an Alzheimer's disease diagnosis. The measure has demonstrated good test-retest reliability and strong inter-rater reliability with Cohen's kappa values >0.70. Internal consistency is also high with a Cronbach's alpha coefficient of 0.82 (Logsdon et al., 1999).

Acceptance and Action Questionnaire-II (AAQ-II)

The AAQ-II is a 7-item questionnaire that measures psychological flexibility-inflexibility and experiential avoidance (Bond et al., 2011). The measure has shown that psychological flexibility is a prominent factor in understanding psychological health (Hayes et al., 2006). The AAQ-II has an alpha coefficient of 0.84 and demonstrates good test-retest reliability at 3-months at 0.81 and 12-months at 0.79 (Bond et al., 2011).

Table 3.1 Timeframe of Measurements for participants in MBSR Intervention

Measures Taken		**(Time 1)**								**(Time 2)**	**(Time 3)**
Item	0-week	1-week	2-week	3-week	4-week	5-week	6-week	7-week (All Day)	8-week	9-week (Post-MBSR)	13-week (Follow-Up)
Screening											
(MoCA and GDS)	X										
Feasibility Measures		X	X	X	X	X	X	X	X	X	X
Qualitative Measures											
Focus Group (Participants)										X	
Interview with MBSR teachers											X
Evaluations (Participants)						X				X	
Weekly Research Meeting Notes		X	X	X	X	X	X	X	X	X	
Weekly Field Notes		X	X	X	X	X	X	X	X	X	
Quantitative Measures											
COPM (Satisfaction / Performance)		X								X	X
PHQ-9 (Mood)		X								X	X
GAI (Anxiety)		X								X	X
CAMS-R (Mindfulness)		X								X	X
PSS (Stress)		X								X	X
QoL-ADAS (Quality-of-Life)		X								X	X
AAQ-II (Acceptance)		X								X	X

Sample Size

The goal is to recruit approximately 30 plus participants (e.g., approximately ≥ 15 MBSR and ≥ 15 wait-list controls) to fit comfortably in a room. This number is feasible in the practice context and will enable examination of study objectives. To achieve this goal, 48 participants from the interprofessional primary care team will be recruited to account for an expected 20% attrition rate based on other feasibility studies (Aguirre et al., 2017; Eldridge et al., 2016).

Recruitment

Participants will be recruited within the interprofessional primary care clinic. Posters will be placed in the waiting area, clinic and physician consult rooms and other interdisciplinary primary care providers may also inform potential participants about the study. Interested participants will be instructed to call the PI who will explain the purpose of the research and study activities. If interested, participants will be scheduled for an intake assessment to screen for study eligibility. If eligible, the informed consent process will be reviewed with the individual, written consent obtained, and then randomization into one of the two groups will be completed.

Treatment allocation and randomization

A block size design of four will be used to balance participants in the control or intervention groups by preventing over-allocation to either group. The block size design of four will randomly allocate two participants in the control and two in the intervention group resulting in six different possible block combinations, ideal for this feasibility study with a sample size of 30 plus participants. A critical aspect of randomization is the impossibility to determine *a priori* allocation of each participant (Guerrera et al., 2017). An independent research staff member, not involved in the trial, will design and prepare the randomization and sequence generation in sealed opaque envelopes to ensure allocation concealment for distribution. All research staff, including the PI, will be blinded to the randomization list. At screening, if participants are eligible, the PI (first author) will obtain informed consent, assign participants a study number and collect baseline data. Last, a randomization envelope with the same study number of the participant will be opened, and allocation will be to one of the two treatment groups (Altman, 2018), intervention (Group 1) or a wait-list control (Group 2). Randomization of participants to either the MBSR or WCL groups will occur during the recruitment period of four and a half months. The wait-list control group will receive the MBSR intervention three months later when the experimental group is completed. Of note, during the three-month waiting period, the wait-list control group would be expected to receive usual care or everyday routine care as part of their health care needs within primary care.

Blinding

The PI will assess baseline outcome measures for eligible participants at T1-week-1. A blinded independent assessor will evaluate post-intervention at T2-week-9 and at T3-week-13, to minimize bias. The wait-list control (Group 2) is assessed at T2-week-9 and T3-week-13, along with the intervention (Group 1). To minimize unblinding, a research volunteer will provide reminder calls for the participants' assessment date and time and will remind them not to disclose which group they are in during their assessment. Also, the independent assessor will again instruct all participants not to disclose which group they are in prior to their assessment. Due to the nature of the population with cognitive impairment, some participants may disclose their group unintentionally to the assessor. If unblinding occurs, it will be documented which participant disclosed, and it will be noted in the analysis. The Qualified-MBSR teachers delivering the intervention cannot be blinded to the group allocation as they are providing the intervention being tested. Similarly, unblinding may occur if participants guess which group they are in (e.g., intervention or control) however, participants are unable to confirm until after the study is completed.

Data Management

The technical support department at the interprofessional primary care clinic will encrypt all computer tablets before distributing them to the intervention participants. The independent assessor will be in charge of data management including and data entry. All original hard copies of the study data, including questionnaires, teacher notes will be kept under lock and key in a secure location within the clinic. The PI will be responsible for overseeing the entire study and ensure timelines are met, data is cleaned, accurate and any missing values are identified. The committee from Queen's University and the University of Toronto will service the role of data monitoring committee as part of PI's Ph.D. research program.

Qualitative data will be collected from both MBSR teachers and participants. MBSR teacher data will include weekly field notes and weekly meeting notes. A research assistant will conduct semi-structured interviews with each MBSR teacher at the completion of the intervention. Qualitative participant data will include open-ended feedback surveys at week-4 (mid-point) and week-8 (program completion) and a focus group that will be conducted at the end of the MBSR program. A research assistant will conduct a focus group using a guided script that will be an hour in duration. The focus group will explore satisfaction (e.g., intervention and delivery), acceptability, perceived value, barriers and facilitators of the 8-week occupational therapist-led MBSR program in primary care.

Qualitative Analysis

Participant focus group and individual MBSR teacher interviews will be audio-recorded and transcribed verbatim. All transcripts will be de-identified and pseudonyms will be given to each of the participants. Transcripts will be read and re-read by both the PI and the research team. An inductive process of sorting, initial coding and grouping the data into broad topic-oriented categories, which is refined into fewer analytical themes, will be used (Clarke & Braun, 2017). Critical discussion with the research staff of emerging themes will occur throughout the analysis process. The qualitative software package NVivo 11 (QSR International) will be used to support the analysis.

To enhance trustworthiness, member checking will be used as a strategy (Connelly, 2016). Peer debriefing, triangulation, and an audit trail will be used to clarify interpretations of the data that may identify possible sources of bias. Each of these strategies will enhance trustworthiness to ensure dependability, credibility and transferability in the qualitative analysis (Hadi & José Closs, 2016).

Quantitative Analysis

The primary and secondary outcome measures will be interpreted and analyzed by the PI using IBM Statistical Package for Social Sciences software (SPSS). A biostatistician will be consulted to provide an arms-length review of the analysis. Every attempt to minimize missing data will be implemented; however, the research team will use intent-to-treat (ITT), an approach that includes every participant. The ITT analysis will preserve the same sample size and reduce type I error. As a feasibility study with a small sample size, missing data is dealt with by using the last observation carried forward (LOCF) method, where the last available measurement for each participant at the point before withdrawal from the study, is retained and used in the analysis. In a future larger study, researchers will undertake a more sophisticated approach to allow additional factors to account for attrition (Wong et al., 2011).

Baseline differences between the two groups will be tested using two-sample t-tests for normal distribution variables using the Shapiro-Wilk test and chi-squared tests for categorical variables. Determining differences in clinical outcomes is not the object of this study. However, comparisons will be undertaken to investigate the estimates of the treatment effects for these potential clinical outcomes. Baseline at T1-week-1 to T2-week-8 and T1-week-1 to T3-week-12 will be analyzed relative to change from baseline using one-way repeated analysis of variance (ANOVA) for each participant and outcome measure. However, if there are any differences between the two groups, an analysis of covariance (ANCOVA) will be performed and adjustments will be made for baseline scores, as appropriate e.g., age, sex and education as possible confounders. For clinical outcome data, results will be reported as between-group mean, SD, change scores, and treatment effects with a confidence interval (CI) at 95%. Significance levels and Cohen's *d* effect sizes will be reported at 95% CI (Evans, 2014). Similarly, feasibility and acceptability outcomes will be analyzed using descriptive statistics (e.g., adherence, attrition, frequency and duration logins) of intervention at baseline and the post-intervention outcome will be undertaken.

(Insight Timer – App metrics):

The number of login (frequency) and length of home practice (duration) are extracted by the following: days, weeks, months and total hours overall for the duration of the MBSR program. Descriptive statistics, including paired-sample *t*-tests or Wilcoxon, signed rank tests, is conducted to compare pre-post change scores on outcomes.

Benefits of Participants

This protocol has been designed to explore the feasibility of conducting an RCT to determine whether an 8-week MBSR program is feasible for a future larger clinical trial. There is growing recognition that interprofessional primary care teams are able to better support individuals with complex health conditions as compared to physician care alone. This study will be the first to explore the feasibility of an occupational therapist-led MBSR program and provide valuable insights as to how MBSR can be best delivered with this population. In addition, this study will provide details to better implement this intervention with the use of technology, such as computer tablets to deliver the MBSR program. Last, findings from this trial, if successful, will lay the foundation for a larger clinical trial. This study will highlight the possible benefits of MBSR and evaluation as a way to support psychological symptoms for those living with early memory issues within interprofessional primary care context.

Patient and public involvement

Patients and public members were not invited to provide feedback on the study design and the conduct of carrying out the study. The main results of the study will be disseminated to participants either through a letter or a face-to-face meeting if interested with respect to their results from baseline and end-of-study assessments.

References

Aguirre, E., Stott, J., Charlesworth, G., Noone, D., Payne, J., Patel, M., & Spector, A. (2017). Mindfulness-Based Cognitive Therapy (MBCT) programme for depression in people with early stages of dementia: study protocol for a randomised controlled feasibility study. *3*. Doi:10.1186/s40814-017-0143-x

Altman, D. G. (2018). Avoiding bias in trials in which allocation ratio is varied. *Journal of the Royal Society of Medicine, 111*(4), 143-144. Doi:10.1177/0141076818764320

American Psychiatric, A., & American Psychiatric Association, D. S. M. T. F. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.). Washington, D.C: American Psychiatric Association.

Belchior, P., Korner-Bitensky, N., Holmes, M., & Robert, A. (2015). Identification and assessment of functional performance in mild cognitive impairment: A survey of occupational therapy practices. *Australian Occupational Therapy Journal, 62*(3), 187-196. Doi:10.1111/1440-1630.12201

Black, D. S., O'Reilly, G. A., Olmstead, R., Breen, E. C., & Irwin, M. R. (2015). Mindfulness Meditation and Improvement in Sleep Quality and Daytime Impairment Among Older Adults With Sleep Disturbances: A Randomised Clinical Trial. *JAMA Internal Medicine, 175*(4), 494-501. Doi:10.1001/jamainternmed.2014.8081

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., . . . Zettle, R. D. (2011). Preliminary Psychometric Properties of the Acceptance and Action Questionnaire–II: A Revised Measure of Psychological Inflexibility and Experiential Avoidance. *Behavior Therapy, 42*(4), 676-688. Doi:10.1016/j.beth.2011.03.007

Canada Year Book. (2011). Seniors.

Canadian Centre on Substance Use and Addiction. (2018). *Canada's low-risk alcohol drinking guidelines* [Brochure]. https://www.ccsa.ca/canadas-low-risk-alcohol-drinking-guidelines-brochure

Carswell, A., McColl, M. A., Baptiste, S., Law, M., Polatajko, H., & Pollock, N. (2004). The Canadian Occupational Performance Measure: A Research and Clinical Literature Review. *Canadian Journal of Occupational Therapy, 71*(4), 210-222. Doi:10.1177/000841740407100406

Chan, A.-W., Tetzlaff, J., Altman, D., Laupacis, A., Gøtzsche, P., Krleza-Jeric, K., . . . Moher, D. (2013). SPIRIT 2013 Statement: Defining Standard Protocol Items for Clinical Trials. *Annals of internal medicine, 153*(3), 200-207.

Ciro, C. A. (2014). Maximizing ADL Performance to Facilitate Aging in Place for People with Dementia. *Nursing Clinics of North America, 49*(2), 157-169. Doi:10.1016/j.cnur.2014.02.004

Clarke, V., & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology, 12*(3), 297-298. Doi:10.1080/17439760.2016.1262613

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A Global Measure of Perceived Stress. *Journal of Health and Social Behavior, 24*(4), 385-396.

Connelly, L. M. (2016). Trustworthiness in Qualitative Research. *Medsurg nursing : official journal of the Academy of Medical-Surgical Nurses, 25*(6), 435.

Creswell, J. D., Irwin, M. R., Burklund, L. J., Lieberman, M. D., Arevalo, J. M. G., Ma, J., . . . Cole, S. W. (2012). Mindfulness-Based Stress Reduction training reduces loneliness and pro-inflammatory gene expression in older adults: A small randomised controlled trial. *Brain, Behavior, and Immunity, 26*(7), 1095-1101. Doi:10.1016/j.bbi.2012.07.006

De Vriendt, P., Gorus, E., Cornelis, E., Velghe, A., Petrovic, M., & Mets, T. (2012). The process of decline in advanced activities of daily living: a qualitative explorative study in mild cognitive impairment. *International Psychogeriatrics, 24*(6), 1-13. Doi:10.1017/S1041610211002766

Dhalwani, N. N., Fahami, R., Sathanapally, H., Seidu, S., Davies, M. J., & Khunti, K. (2017). Association between polypharmacy and falls in older adults: a longitudinal study from England. *BMJ Open, 7*(10), e016358-e016358. Doi:10.1136/bmjopen-2017-016358

Donnelly, C., & Carswell, A. (2002). Individualized Outcome Measures: A Review of the Literature. *Canadian Journal of Occupational Therapy, 69*(2), 84-94. Doi:10.1177/000841740206900204

Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A. (2016). CONSORT 2010 statement: extension to randomised pilot and feasibility trials. *BMJ, 355*, i5239. Doi:10.1136/bmj.i5239

Evans, A. (2014). *Using basic statistics in the behavioral and social sciences* (Fifth ed.). Thousand Oaks, California: SAGE Publications, Inc.

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J.-P. (2007). Mindfulness and Emotion Regulation: The Development and Initial Validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment, 29*(3), 177-190. Doi:10.1007/s10862-006-9035-8

Foulk, M. A., Ingersoll-Dayton, B., Kavanagh, J., Robinson, E., & Kales, H. C. (2014). Mindfulness-Based Cognitive Therapy With Older Adults: An Exploratory Study.

Journal of Gerontological Social Work, 57(5), 498-520. Doi:10.1080/01634372.2013.869787

Gearing, R. E., El-Bassel, N., Ghesquiere, A., Baldwin, S., Gillies, J., & Ngeow, E. (2011). Major ingredients of fidelity: A review and scientific guide to improving quality of intervention research implementation. *Clinical Psychology Review, 31*(1), 79-88. Doi:10.1016/j.cpr.2010.09.007

Geiger, P. J., Boggero, I. A., Brake, C. A., Caldera, C. A., Combs, H. L., Peters, J. R., & Baer, R. A. (2016). Mindfulness-Based Interventions for Older Adults: a Review of the Effects on Physical and Emotional Well-Being. *Mindfulness, 7*(2), 296-307. Doi:10.1007/s12671-015-0444-1

Greenberg, S. A. (2007). How to Try This: Geriatric Depression Scale: Short Form. *The American Journal of Nursing, 107*(10), 60–70. https://doi.org/10.1097/01.NAJ.0000292204.52313.f3

Hadi, M. A., & José Closs, S. (2016). Ensuring rigour and trustworthiness of qualitative research in clinical pharmacy. *International Journal of Clinical Pharmacy, 38*(3), 641-646. Doi:10.1007/s11096-015-0237-6

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy, 44*(1), 1-25. Doi:10.1016/j.brat.2005.06.006

Hayes, S. C., Strosahl, K., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., . . . McCurry, S. M. (2004). Measuring experiential avoidance: A preliminary test of a working model. *The Psychological Record, 54*(4), 553-578. Doi:10.1007/BF03395492

Horton, D. K., Hynan, L. S., Lacritz, L. H., Rossetti, H. C., Weiner, M. F., & Cullum, C. M. (2015). An Abbreviated Montreal Cognitive Assessment (MoCA) for Dementia Screening. *The Clinical Neuropsychologist*, *29*(4), 413–425. https://doi.org/10.1080/13854046.2015.1043349

Glazier, R.H, Hutchison, B., Kopp, A. (2015). *Comparison of Family Health Teams to Other Ontario Primary Care Models, 2004/05 to 2011/12*. Toronto: Institute for Clinical Evaluative Sciences.

Jessen, F., Amariglio, R. E., Buckley, R. F., van der Flier, W. M., Han, Y., Molinuevo, J. L., Rabin, L., Rentz, D. M., Rodriguez-Gomez, O., Saykin, A. J., Sikkes, S. A. M., Smart, C. M.; Wolfsgruber, S., Wagner, M. (2020). The Characterisation of Subjective Cognitive Decline. *Lancet neurology, 19*(3), 271–278. https://doi.org/10.1016/S1474-4422(19)30368-0.

Joosten-Weyn Banningh, E. W. A., Vernooy-Dassen, M. J. F. J., Olde Rikkert, M. G. M., & Teunisse, J. P. W. M. (2008). Mild cognitive impairment: coping with an uncertain label. *International Journal of Geriatric Psychiatry, 23*(2), 148-154. Doi:10.1002/gps.1855

Kabat-Zinn, J., & University of Massachusetts Medical Center/Worcester. Stress Reduction, C. (2009). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness* (Delta trade pbk. Reissue, 15th anniversary ed.). New York, N.Y: Delta Trade Paperbacks.

Klee, M.; Leist, A. K.; Veldsman, M.; Ranson, J. M.; Llewellyn, D. J. (2023). Socioeconomic Deprivation, Genetic Risk, and Incident Dementia. *American journal of preventive medicine, 64*(5), 621–630. https://doi.org/10.1016/j.amepre.2023.01.012.

Knopman, D. S., & Petersen, R. C. (2014). Mild cognitive impairment and mild dementia: a clinical perspective. *Mayo Clinic proceedings, 89*(10), 1452-1459. Doi:10.1016/j.mayocp.2014.06.019

Kok, R. M., & Reynolds, C. F. (2017). Management of Depression in Older Adults: A Review. *JAMA, 317*(20), 2114-2122. Doi:10.1001/jama.2017.5706

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606-613. Doi:10.1046/j.1525-1497.2001.016009606.x

Langa, K. M., & Levine, D. A. (2014). The Diagnosis and Management of Mild Cognitive Impairment: A Clinical Review. *JAMA, 312*(23), 2551-2561. Doi:10.1001/jama.2014.13806

Laudisio, A., Antonelli Incalzi, R., Gemma, A., Marzetti, E., Pozzi, G., Padua, L., Bernabei, R., & Zuccalà, G. (2018). Definition of a Geriatric Depression Scale cutoff based upon quality of life: a population-based study. *International Journal of Geriatric Psychiatry, 33*(1), e58–e64. https://doi.org/10.1002/gps.4715

Law, M., & Canadian Association of Occupational, T. (2005). *Canadian Occupational Performance Measure* (4th ed.). Ottawa, Ont: Canadian Association of Occupational Therapists.

Lee, E.-H. (2012). Review of the Psychometric Evidence of the Perceived Stress Scale. *Asian Nursing Research, 6*(4), 121-127. Doi:10.1016/j.anr.2012.08.004

Logsdon, R. G., Gibbons, L. E., Teri, L., & McCurry, S. M. (1999). Quality of life in alzheimer's disease: longitudinal perspectives. *The Gerontologist, 39*, 164.

Logsdon, R. G., Gibbons, L.E. McCurry, S.,M., Teri, L. (1999). Quality of Life in Alzheimer's Disease: Patient and Caregiver Reports. *Journal of Mental Health and Aging, 5*(1), 21-32.

Moniz-Cook, E. (2011). Psychosocial interventions through memory clinics. *Nursing & Residential Care, 13*(4), 189-192.

Pachana, N. A., Byrne, G. J., Siddle, H., Koloski, N., Harley, E., & Arnold, E. (2007). Development and validation of the Geriatric Anxiety Inventory. *International Psychogeriatrics, 19*(1), 103-114. Doi:10.1017/S1041610206003504

Perepletchikova, F., & Kazdin, A. E. (2005). Treatment Integrity and Therapeutic Change: Issues and Research Recommendations. *Clinical Psychology: Science and Practice, 12*(4), 365-383. Doi:10.1093/clipsy.bpi045

Petersen, R. C., Caracciolo, B., Brayne, C., Gauthier, S., Jelic, V., Fratiglioni, L., . . . Stressforskningsinstitutet. (2014). Mild cognitive impairment: a concept in evolution. *Journal of Internal Medicine, 275*(3), 214-228. Doi:10.1111/joim.12190

Phelan, E., Williams, B., Meeker, K., Bonn, K., Frederick, J., Logerfo, J., & Snowden, M. (2010). A study of the diagnostic accuracy of the PHQ-9 in primary care elderly. *BMC family practice, 11*(1), 63-63. Doi:10.1186/1471-2296-11-63

Regan, B., & Varanelli, L. (2013). Adjustment, depression, and anxiety in mild cognitive impairment and early dementia: a systematic review of psychological intervention studies. *International psychogeriatrics / IPA, 25*(12), 1963. Doi:10.1017/S104161021300152X

Smart, C. M., Segalowitz, S. J., Mulligan, B. P., Koudys, J., & Gawryluk, J. R. (2016). Mindfulness Training for Older Adults with Subjective Cognitive Decline: Results from a Pilot Randomised Controlled Trial. *Journal of Alzheimer's disease 52*(2), 757. R

Smoski, M. J., McClintock, A., & Keeling, L. (2016). Mindfulness Training for Emotional and Cognitive Health in Late Life. *Current Behavioral Neuroscience Reports, 3*(4), 301-307. Doi:10.1007/s40473-016-0097-y

Splevins, K., Smith, A., & Simpson, J. (2009). Do improvements in emotional distress correlate with becoming more mindful? A study of older adults. *Aging & Mental Health*, *13*(3), 328-335. Doi:10.1080/13607860802459807

Insight Timer (version 2019) [Mobile Application Software] Retreived from https://insighttimer.com. (2019). Timer, I. [Mobile application software]

Tuntland, H., Aaslund, M. K., Langeland, E., Espehaug, B., & Kjeken, I. (2016). Psychometric properties of the Canadian Occupational Performance Measure in home-dwelling older adults.(ORIGINAL RESEARCH). *Journal of Multidisciplinary Healthcare, 9*(1), 411. Doi:10.2147/JMDH.S113727

Wells, R. E., Kerr, C. E., Wolkin, J., Dossett, M., Davis, R. B., Walsh, J., . . . Yeh, G. (2013). Meditation for Adults with Mild Cognitive Impairment: A Pilot Randomised Trial. *Journal of the American Geriatrics Society, 61*(4), 642-645. Doi:10.1111/jgs.12179

Wong, W. K., Boscardin, W. J., Postlethwaite, A. E., & Furst, D. E. (2011). Handling missing data issues in clinical trials for rheumatic diseases. *Contemporary Clinical Trials, 32*(1), 1-9. Doi:10.1016/j.cct.2010.09.001

Wong, W. P., Coles, J., Chambers, R., Wu, D. B.-C., Hassed, C. (2017). The Effects of Mindfulness on Older Adults with Mild Cognitive Impairment. *Journal of Alzheimer's Disease Reports*, *1*(1), 181–193. https://doi.org/10.3233/ADR-170031.

Zhu, X., Song, H., Chang, R., Chen, B., Song, Y., Liu, J., Wang, K. (2021). Combining Compensatory Cognitive Training and Medication Self-Management Skills Training, in Inpatients with Schizophrenia: A Three-Arm Parallel, Single-Blind, Randomized Controlled Trial. *General hospital psychiatry*, *69*, 94–103. https://doi.org/10.1016/j.genhosppsych.2020.12.012.

Zuniga, K. E., Mackenzie, M. J., Kramer, A., & McAuley, E. (2016). Subjective memory impairment and well-being in community-dwelling older adults. *Psychogeriatrics, 16*(1), 20-26. Doi:10.1111/psyg.12112

Chapter 4 – Mindfulness-based stress reduction for community-dwelling older adults with subjective cognitive decline (SCD) and mild cognitive impairment (MCI) in primary care: A mixed-methods feasibility randomized control trial

Citation: Tran, T., Donnelly, C., Nalder, E., Trothen, T., Finlayson, M. (2023). Mindfulness-based stress reduction for community-dwelling older adults with subjective cognitive decline (SCD) and mild cognitive impairment (MCI) in primary care: A mixed-methods feasibility randomized control trial. BMC Primary Care 2023

Abstract

Background: Primary care is often the first point of contact when community-dwelling older adults experience subjective cognitive decline (SCD) or mild cognitive impairment (MCI). Living with SCD or MCI can be life-altering, resulting in low mood and increased anxiety, further exacerbating cognitive decline. However, there is scant literature on interventions that interprofessional primary care providers can provide to support those living with SCD or MCI. Practicing mindfulness-based stress reduction (MBSR) in an interprofessional primary care setting may support emotional health and well-being for those with cognitive decline, but it has not been studied in an interprofessional primary care context.

Objectives: This study's primary aim was to determine the feasibility of, and perceived benefits to and satisfaction with, a 9-Week MBSR program delivered in a team-based primary care setting. The secondary aim was to examine the acceptability of using technology (computer tablet and App Insight Timer®) for program delivery and home practice.

Methods: A convergent mixed-methods, single-blind pilot randomized controlled trial (RCT) study design was used. A quantitative strand was used to evaluate the feasibility of the MBSR program. The qualitative strand used a focus group with older adult participants with SCD or MCI. Individual semi-structured interviews with occupational therapists who are qualified-MBSR teachers were conducted to explore the acceptability of using computer tablets for program delivery and home practice.

Results: 27 participants were randomized (14 MBSR; 13 Control) with retention rates of 64.3% (9/14 completed ≥ 6 sessions), true adherence rates of 50% (7/14 met ≥ 19.5 hrs of home practice), 21.4% attrition rates, and 100% post-intervention follow-up. No participants who used computer tablets at the beginning of the intervention switched to low technology. Older adult participants found the use of computer tablets in the MBSR course acceptable and appreciated the portability of the tablets.

Conclusions: Based on the lower-than-expected rates of recruitment, retention, and adherence, our study, as designed, did not meet the feasibility benchmarks that were set. However, minor modifications to the design, including changing how participants who drop-out are analyzed, extending recruitment, and adding multiple sites, this intervention would be well suited to further study using a full-scale RCT. We found that embedding MBSR in an interprofessional primary care setting was feasible in practice and qualitative data highlighted the satisfaction and perceived benefits based on the intervention. The use of technology was acceptable and portable, as participants utilized their computer tablets consistently until the study's end. Our study showed that older adults living with SCD or MCI were highly receptive to learning how to use technology, and future group intervention programs in interprofessional primary care settings may also incorporate tablet use.

Trial registration: This study was reviewed and approved by the Research Ethics Board in Toronto, Ontario, Canada (REB# 2017-0056-E); Queen's University (REB# 6026418) in Kingston, Ontario, Canada, and Clinicaltrials.gov (08/03/2019; NCT03867474).

Background

According to the World Health Organization (WHO, 2018), the world's population of adults aged 60 years and older is expected to reach 2 billion by 2050. As older adults live longer, the risk of developing neurodegenerative diseases, such as Alzheimer's disease (AD), increases. A *Canadian Study on Health and Aging* estimated that there are currently 564,000 persons living with dementia, and this number will increase to 937,000 by 2031. Of note, more than 65 percent are projected to be women (Health Canada, 2016, October).

It is estimated that one-third of community-dwelling older adults will experience cognitive complaints (Zuniga et al., 2016). Experiences of cognitive decline vary, including for individuals with the earliest signs of memory complaint defined as subjective cognitive decline (SCD), a self-experienced persistent decline in cognitive capacity, compared with previously cognitive status and normal performance on standardized cognitive tests used to classify MCI, adjusted for age, sex and education (Jessen et al., 2020). The next stage of cognitive dysfunction (Park, 2017) is mild cognitive impairment (MCI), which is defined as having an impairment in one or more of the cognitive domains relative to appropriate normative data for that individual (Petersen et al., 2014). The prevalence of MCI is between 15% and 20% in older adults aged ≥ 60 years, and the rate of MCI progressing to dementia, a more severe cognitive impairment, is between 8% to 15% per year (Petersen, 2016).

As cognitive performance declines, older adults with SCD or MCI report inefficiency with day-to-day functioning, particularly complex instrumental activities of daily living, such as financial management and shopping (Belchior et al., 2015). Such individuals may take longer to complete complex tasks and make more errors than in the past (Albert et al., 2011; Petersen et al., 2014), while basic activities of daily living such as bathing, dressing and feeding are all intact

(Montoro-Membila, Arnedo Montoro, Funes, & Rodríguez-Bailón, 2021). This subtle functional decline may result in a general sense of dissatisfaction and discontentment experienced by older adults with respect to their overall functional performance (De Vriendt et al., 2012). Furthermore, the emotional aspect of living with SCD or receiving an MCI diagnosis can negatively impact an individual's emotional health and well-being (Joosten-Weyn Banningh, Vernooy-Dassen, Olde Rikkert, & Teunisse, 2008). As such, it may raise fears of dependency on others, and activity limitation (Johansson, Marcusson, & Wressle, 2015), which may result in depressive mood and increased anxiety (Joosten-Weyn Banningh et al., 2008; Reid & MacLullich, 2006; Wettstein, Seidl, Wahl, Shoval, & Heinik, 2014).

The efficacy of pharmacological management to improve concomitant depressive disorders among the general population and older adults living with cognitive impairment is emerging (Perini et al., 2019). However, researchers have found that pharmacological interventions are over-prescribed in older adults, despite the potential risk of drug-induced side effects (Andreescu & Varon, 2015), drug complications (Kok & Reynolds, 2017), and falls (Dhalwani et al., 2017).

Clinical guidelines for the management of cognitive impairment in primary care prioritize non-pharmacological interventions, which are appropriate to patients' cognitive and physical capabilities (B.C.Guidelines, 2016). Therefore, identifying effective non-pharmacological interventions to mitigate psychosocial factors, such as anxiety and low mood, and supporting functional performance with those living with SCD or MCI is warranted (Andreescu & Varon, 2015; Sepehry et al., 2012). The expanding focus of interventional research in primary care is to evaluate management strategies to reduce symptoms before further irreversible dysfunction has occurred for older adults at risk of developing AD. Ideally, reducing the incidence and prevalence of AD (Crous-Bou et al., 2017) would be crucial.

Primary care teams are gaining increased attention in Canada as potentially being a significant way to help address the complexities of the changing Canadian demographics, including an aging population and an increase in chronic physical and mental health conditions. It has been noted that a holistic approach to care that addresses the well-being and mental health of older adults is imperative (Hazlett-Stevens et al., 2018). Primary care teams can offer this broader lens through the use of mindfulness-based stress reduction (MBSR), a 9-Week program that was first introduced in 1979 by Jon Kabat-Zinn (Kabat-Zinn & University of Massachusetts Medical Center/Worcester. Stress Reduction, 2009). MBSR is used to treat a variety of clinical psychiatric diagnoses (e.g., depression, anxiety, perceived stress) (Baer et al., 2012; Bohlmeijer et al., 2010; Vollestad et al., 2011) and to help cope with other clinical illnesses (e.g., HIV, diabetes, cancer) (Huang et al., 2016; Jam et al., 2010; Ni et al., 2020). MBSR is widely taught in hospitals, community centres, universities, schools and in private practice. Since its inception, MBSR has demonstrated considerable positive mental health outcomes for the general adult population (Gu et al., 2015; Khoury et al., 2015). More recently, small proof-of-concept and pilot studies have found MBSR to be feasible with older adults with early cognitive deficits such as SCD and MCI (Fam et al., 2020; Smart et al., 2016; Wells et al., 2013). Furthermore, there is mounting evidence that mindfulness-based interventions such as MBSR can help community-dwelling older adults living with cognitive dysfunction to self-manage anxiety, depressive symptoms, as well as perceived stress in the context of SCD or MCI, which in turn may support their emotional health and well-being (Goldberg et al., 2019; Marciniak et al., 2020; Shim et al., 2021).

Primary care providers on Family Health Teams (FHTs) are usually the first point of contact when older adults experience cognitive problems such as SCD or MCI (Knopman & Petersen, 2014). There is an increasing emphasis on these interprofessional primary care teams to support and address the healthcare needs of the aging population. However, there has been limited research examining the benefits of an MBSR program with older adults living with cognitive complaints, and no studies have examined the use of MBSR in an interprofessional primary care setting with this population. Drawing on the expertise and understanding of cognitive problems and their impact on daily functioning, occupational therapists working on primary care teams are well-positioned to address the functional and psychosocial needs of community-dwelling older adults living with SCD or MCI. However, there is currently scant information on the types of health services provided by occupational therapists to older adults with SCD or MCI in primary care settings.

This study's primary objective was to evaluate the feasibility of an occupational therapist-led MBSR program, for community-dwelling older adults living with SCD or MCI, in primary care. The secondary objective was to evaluate the acceptability of using technology (e.g., computer tablets and App Insight Timer®) as a tool for program delivery and home practice.

Methods

Study design

A convergent mixed-methods, single-blind pilot randomized controlled trial (RCT) with quantitative and qualitative strands was used to assess the feasibility of a 9-Week MBSR program, and the acceptability of using computer tablets for program delivery and home practice.

Ethical Considerations

This study was approved, and all methods were performed in accordance with guidelines and regulations issued by the Research Ethics Board in Toronto, Ontario, Canada (REB# 2017-0056-E) and Queen's University (REB# 6026418) in Kingston, Ontario, Canada.

Study setting

The study took place between August and October 2019 in one academic FHT in a large urban city in the province of Ontario, Canada. FHTs are a model of interprofessional primary care and were introduced in 2006 in Ontario. The FHT is considered a patient medical home, and approximately 25% of Ontarians receive their primary care from this model of care. Primary care teams consist of family physicians and interprofessional health care providers such as: dieticians, occupational therapists, pharmacists, physiotherapists, and social workers (Health Quality Ontario, 2012), all of whom work together to provide comprehensive primary care. The FHT that collected the data included 36 physicians, two dieticians, one occupational therapist, one physiotherapist, two social workers, and one pharmacist, and it had approximately 18,000 rostered patients.

Eligibility criteria

This study recruited rostered patients from the FHT with the following inclusion criteria: (i) aged ≥ 60 years; (ii) fluent in English; (iii) living independently in the community (non-assisted living, e.g., retirement or any long-term care facility); and (iv) had a cognitive complaint. SCD was assessed using: (i) Jessen et al.'s (2020) criteria of self-experienced persistent decline in cognitive capacity in comparison with a previously normal status and unrelated to an acute event; and (ii) a Montreal Cognitive Assessment (MoCA) score of ≥ 26 to ensure objectively they do not have MCI (Horton et al., 2015; Rotenber et al., 2020). On the other hand, clinical characterization of MCI in other similar clinical studies was assessed using Horton et al.'s (2015) cut-off scores of self-reported cognitive complaints, with an objective cognitive impairment on the MoCA with the following range = 20-25 (Carson, Leach, & Murphy, 2018; Horton et al., 2015, Petersen et al., 2014; Rotenber et al., 2020) or had a confirmed MCI diagnosis noted in their electronic medical record (EMR). Exclusion criteria were: (i) history of prior participation in an MBSR program or having ≥ 1.5 hrs of other mindfulness practices, including yoga; (ii) currently experiencing significant health issues (e.g., receiving chemotherapy, brain injury) or a psychiatric condition (e.g., significant clinical depression); (iii) active substance use disorder; (iv) involved in another cognitive or memory program or another research study and (v) Communication barriers (i.e., hearing impairment).

Recruitment

Participants were recruited within the FHT through posters placed in waiting areas, clinics, and physician consult rooms. Interprofessional primary care providers also recruited potential participants for the study. The recruitment period was approximately four and a half months in duration.

Treatment allocation and randomization

Once informed consent was obtained from all study participants, they were randomly allocated to either a 9-Week MBSR program or to a 9-Week wait-list control group. A research staff member not involved in the study design prepared the randomization sequence in opaque sealed envelopes to ensure allocation concealment for distribution. All research staff, including the Principal Investigator (PI), were blinded to the randomization list. The wait-list control group received the MBSR intervention post-three-months when the experimental group was completed. Our study protocol has been published previously (Tran et al., 2020). All original study data, from focus group interviews to feasibility data such as attendance and field notes, were all kept under lock and key in a secure location within the clinic.

Intervention/treatment (MBSR) group

All MBSR programs consist of an orientation session followed by eight three-hour weekly sessions. Each session consists of various mindfulness practices such as lying down (body scan), sitting (attention on the breath), and mindful movement (yoga and walking). The curriculum also includes an all-day retreat. In our study, the all-day retreat was originally scheduled for the Saturday of Week-6; however, it was moved to the Wednesday of Week-7, thereby extending the program to nine weeks. See **Table 4.1**. As part of our study, participants were also asked to continue with 30 minutes (six days a week) home practice after the 9-Week program for another four weeks and were followed-up at the end of study at Week-13. See **Table 4.2**.

Commonly, MBSR is taught by two instructors. However, in this study, the MBSR course was facilitated by four occupational therapists who were qualified MBSR teachers. Two were primary teachers, and two supported participant adherence and addressed any technological issues that arose before or after the program. MBSR teaching experience ranged between six and 12 years, respectively. Three of the four were trained in the United States (University of Massachusetts or Brown University) and one in Toronto, Ontario, Canada.

Unlike standard MBSR programs, we introduced an additional component. Each participant who had access to Wi-Fi received a tablet computer (mini-iPad3) to use the Application (App), Insight Timer® (Timer, 2019). The App contained guided meditations for daily home practices (30-45 mins) for the duration of the study (13-Weeks). Participants were able to access home practice by logging directly onto their tablet and accessing the App. In addition, participants were provided with self-report home practice diary sheets to capture their formal and informal practice.

Table 4.1 – Outline of the MBSR/Intervention

Week	Session (3 hrs. duration)	MBSR/Intervention
0	Orientation	Objective of the intervention clarified, dispensing, and demonstrating computer tablets and App Insight Timer. Technological support provided to ensure understanding. Logistics of the MBSR course; formal and informal practices; what to wear/bring; attendance; importance of home practice.
1	1	Introductions in dyads, establishing group norms. Formal practices: mindful eating raisin task, inquiry, break, body scan and inquiry. Home practices were provided – doing the Body scan 6 days out of the week, reading the Upstream and Downstream fable, eating one meal mindfully, and doing the nine-dot exercise.
2	2	Mindful standing movement along with a formal practice of the body scan and inquiry. Home practice will be taken up and discussed. A formal practice of attention on the breath (AOB) will be also introduced along with home practice for next week (e.g., pleasant event calendar, body scan, mindful routine activity and AOB).
3	3	Sitting practice of Attention on the Breath (AOB), along with a formal practice of lying down yoga and with a short body scan and inquiry. Home practice will be taken and discussed regarding the body scan at home, and pleasant event calendar. Home practice for next week will consist of (e.g., unpleasant event calendar, alternating body scan with mindful lying down movement, and self-guided AOB for 5 to 10 mins).
4	4	Standing yoga, with a short 20 mins guided meditation practice and inquiry in dyads, then in a large group, and with taking up the home practice. Taking up unpleasant event calendar and will provide an interactive stress reactivity education session. Home practices will be provided – alternating the Body scan with standing mindful movement 6 days out of the week, and observing stress reactions by noticing (thoughts, moods and behaviour).
5	5	Mindful movement and a sitting practice, with a practice inquiry. Facilitator will ask participants to reflect on the first half of the program with reflective questions as an invitation to recommit to practice for the remainder of the program. Stress reaction versus response was presented in class along with noticing habits and changing response i.e., cow path. Facilitator will introduce S.T.O.P. as a responsive strategy.
6	6	Longer sitting meditation, with a practice inquiry. In dyads, participants will discuss stressful communication, and in large group take up the home practice and discuss intention to cultivate awareness, exploring patterns of communication, and noticing habitual patterns and behaviour (not only in the realm of interpersonal communication, but also in one's inner life). Facilitator will enact Aikido of styles of communications (aggression, passive, conflict, and assertiveness). Discuss new ways of experimenting with "new behaviour" and ways of engaging interpersonally.
7	All Day Silent Retreat	Traditionally done on a weekend; but moved to the following week. A 6-hour long retreat for to deepen the practice in order to cultivate a sense of presence and attention on the present moment and experience.
8	7	Mindful movement of yoga choices, and a sitting practice with a practice inquiry. Inquiry will be around mindful awareness that can change

		relationship to stress and increase choice along with integrating mindfulness more fully into our lives can increase resilience. Different Chair Exercise will be introduced and discussion of attachment or aversion, habitual patterns and beginner's mind. Home practice will be around consumption and developing healthier patterns.
9	8	Reflective practice of the past eight weeks and what participants have learned, the cost or sacrifice made to attend this course. Last practice will be the body scan along with inquiry. Closing ceremony will include the yarn bracelet and giving participants the certificates for course completion. Participants with written and verbal consent will participate in a focus group later in the week.

Table 4.2: Timeframe of Measurement

Measures Taken		**(Time 1)**			**(Time 2)**	**(Time 3)**
Item	0-week	1-week	2-week	………………………………………	9-week (Post-MBSR)	13-week (Follow-Up)
Screening						
Feasibility Measures		X	X	………………………………………	X	X
Qualitative Measures						
Focus Group (Participants)					X	
Interview with MBSR teachers						X

Data Collection

Quantitative Data

Feasibility outcome measures and acceptability of technology

The App was used to collect the frequency of logins and home practice duration and was downloaded weekly onto an Excel spreadsheet by a research assistant at arm's length from the study for data entry and analysis. Participants who had CD players but without Wi-Fi access, were given CDs to use for their guided home practices. However, we instructed all participants to record their home practices using pen and paper daily logs as a backup if a technology malfunctioned.

As previously described, feasibility outcomes included the following objectives: 1(a) patient recruitment, study retention, intervention adherence, and follow-up rates; and 1(b) acceptability of technology (Tran et al., 2020). Data were collected from attendance records, home practice duration and completion, and computer tablet logins; attrition throughout the MBSR program was also tracked.

Objectives 1(a): Feasibility outcome measures

1. Recruitment rate: A target recruitment rate to demonstrate feasibility was defined as 30 plus participants between May and August 2019 (4.5 months), or seven people per month, similar to other feasibility studies (Aguirre et al., 2017) with an enrollment rate of 70%.
2. Retention rate: The target retention rate was at least 75-80% of participants completing six or more of the 10 sessions (including orientation and all-day session), for retention to be deemed successful. In addition, there was a follow-up at Week-13 (e.g., tablet and

self-reported home diary collection). A withdrawal rate of 20% or less was deemed to be indicative of program feasibility based on other feasibility studies (Eldridge et al., 2016).

3. (i) Adherence: An adherence rate was used for participants using tablets, and a true adherence rate was used for participants using tablets and CDs, thus capturing all program participants (those that chose CDs or computer tablets).

   (ii) Adherence rate (tablets only): The adherence rate was deemed adequate if (i) participants completed three logins per week or 39 logins (3 logins per week x 13-weeks) and (ii) formal practice for at least 1.5 hours (90 mins) per week or 19.5 hours (1.5 hours x 13-weeks; 1,170 mins) duration of the study, beyond the 9-week intervention.

   (iii) True Adherence rate (tablets and CDs): Formal meditation home practice is setting aside time to carry out the guided meditation recordings. Informal meditation practice is bringing awareness within the flow of participants' day-to-day activities at any time. As such, to capture both formal and informal practices, a true adherence rate was determined by both i.) attendance rate (attending ≥ 6 or more sessions) and ii.) self-reported home practice diary consisting of formal practice and informal practice totaling ≥ 19.5 hrs (or ≥ 1,170 mins) during the 13-week study. True adherence also includes formal and informal meditation home practice (in minutes).

4. Duration of home practice: Comparing both tablet data collection of formal home practice and self-reported diary home practice logs to determine level of accuracy.

Objectives 1(b): Acceptability of Technology

Acceptability of using tablet computer as a tool for home practice delivery was determined by: (1) field notes by qualified-MBSR teachers documenting group participation, (2) number of participants that switched from computer tablets to low technology (e.g., CDs) for the homework practices for the duration of the MBSR program and (3) focus groups (T2) examining perceived value and benefits of using technology.

Qualitative Data

Qualitative data collection

A focus group was conducted with participants at Week-9, after the last three-hour weekly session, to explore their experience with the MBSR program, and acceptance of technology for program delivery and home practices. The focus group was held at the FHT clinic where the study was conducted. In addition, semi-structured interviews were conducted with the qualified MBSR teachers to explore their experience providing the program. The focus group and interviews were audio-recorded and transcribed verbatim by a research assistant. Participants were de-identified and given a participant number.

Data Analysis

Feasibility outcome measures and acceptability of technology

Feasibility data were entered into an Excel spreadsheet and analyzed using descriptive statistics, including mean, rates, and standard deviations.

Qualitative Analysis

All supportive quotations from the focus group and individual interview transcripts were anonymized and analyzed using thematic analysis described by Braun and Clarke (Clarke & Braun, 2017). Qualitative software Nvivo (Version 12) was employed to support analysis. Investigators used data source triangulation to collect data from the different sources, such as a focus group and in-depth individual interviews. These interviews allowed for spontaneity, flexibility, and responsiveness by eliciting information regarding their personal experiences and perspectives (Carter et al., 2014). Individual MBSR teachers were encouraged to make field notes, noting what was observed during the weekly sessions (e.g., level of engagement, participation with following the guided meditations and involvement with group discussions, or anything else worth noting regarding group dynamics). However, no formal observer triangulation was undertaken. The PI, a co-author and a research team member and author ensured trustworthiness by peer debriefing to discuss their independent coding schemes. Generated codes were presented to the research team and stored in a master codebook. An audit trail was kept and maintained to document decision-making pathways, and reasoning of final analysis. These strategies enhanced trustworthiness by ensuring dependability, credibility and transferability (Hadi & José Closs, 2016).

Data integration

Data integration and analysis used a narrative approach that described the quantitative, and qualitative results thematically. As such, this narrative approach weaved together the feasibility outcome to the qualitative themes related to satisfaction and perceived benefits of the MBSR program (Fetters et al., 2013).

Results

There were five participants in the MBSR group that met the MCI inclusion eligibility for our study. For MCI confirmation, two participants in the MBSR group met the criteria for MCI of: (i) MoCA score of $\leq$ 23; and (ii) an MCI label by their primary care physician in their EMR. Conversely, another six participants in the MBSR group had a MoCA cut-off scores within = 20-25, but lacked the MCI label in their EMR, in which case Horton's et al.'s MCI cut-off criteria was used to assess the participants' cognitive complaints for MCI to meet the study's eligibility.

Participants' characteristics are summarized in **Table 4.3**. Control and intervention groups were similar and had no clinically relevant differences.

Table 4.3 – Characteristics of 14 participants in the 9-week MBSR Program

Characteristics	Total (No., % total) MBSR n = 14	Control n = 13
Age (Mean; SD), years	71.43 (9.0)	75.31 (9.5)
Range	60-83	62-92
Sex: Female	8 (57.1%)	12 (92.3%)
Education Level		
None	2 (14.3%)	1 (7.7%)
High School	3 (21.4%)	2 (15.4%)
College	0 (0%)	3 (23.1%)
University	9 (64.3%)	7 (53.8%)
Living Arrangement		
Alone	4 (28.6%)	8 (61.5%)
With partner	6 (42.9%)	2 (15.4%
With family/friends	4 (28.6%)	3 (23.1%)
Marital Status		
Married	11 (78.6%)	11 (84.6%)
Common-law	1 (7.1%)	2 (15.4%)
Other	2 (14.2%)	0
Currently Employed		
Yes (full-time or part-time)	6 (42.9%)	2 (15.3%)
No (retired)	8 (57.1%)	11 (84.6%)
Household Income		
< $50K	8 (57%)	6 (57%)
$51-99K	2 (14.2%)	5 (38.5%)
> $100K	4 (28.6%)	2 (15.4%)
Have Driver's License		
Yes	11 (78.6%)	5 (38.5%)
Currently Driving		
No	7 (50%)	9 (69.2%)
Previous Head Injury		
Yes	5 (35.7%)	5 (38.5%)
Duration of Physical Activity (e.g., walking, etc.) (Mean; SD) hrs/week	3.83 (3.21)	6.76 (4.60)
Meditation Practice (≤ 1.5 hrs/week)	3 (21.4%)	2 (15.4%)
Those who own an iPad		
Yes	8 (57.1%)	5 (38.5%)
Have Used an iPad before		
Yes	8 (57.1%)	6 (46.2%)
Experience with iPad		
No experience	7 (50%)	9 (69.2%)
1 yr	2 (14.2%)	0 (00.0%)
2 yr	1 (7.1%)	0 (00.0%)
4 yr	0 (00.0%)	2 (15.3%)
5 yr	4 (28.5%)	2 (15.3%)
Montreal Cognitive Assessment (MoCA)	25.00 (2.45)	25.92 (2.29)
MCI Diagnosis		
Yes	2 (14.3%)	2 (15.4%)
No (but MoCA =20-25)	4 (28.6%)	0 (0.00%)
Geriatric Depression Scale (GDS)	2.14 (2.68)	2.92 (2.49)

Feasibility outcome measures and acceptability of technology

Objectives 1(a): Feasibility outcome measures

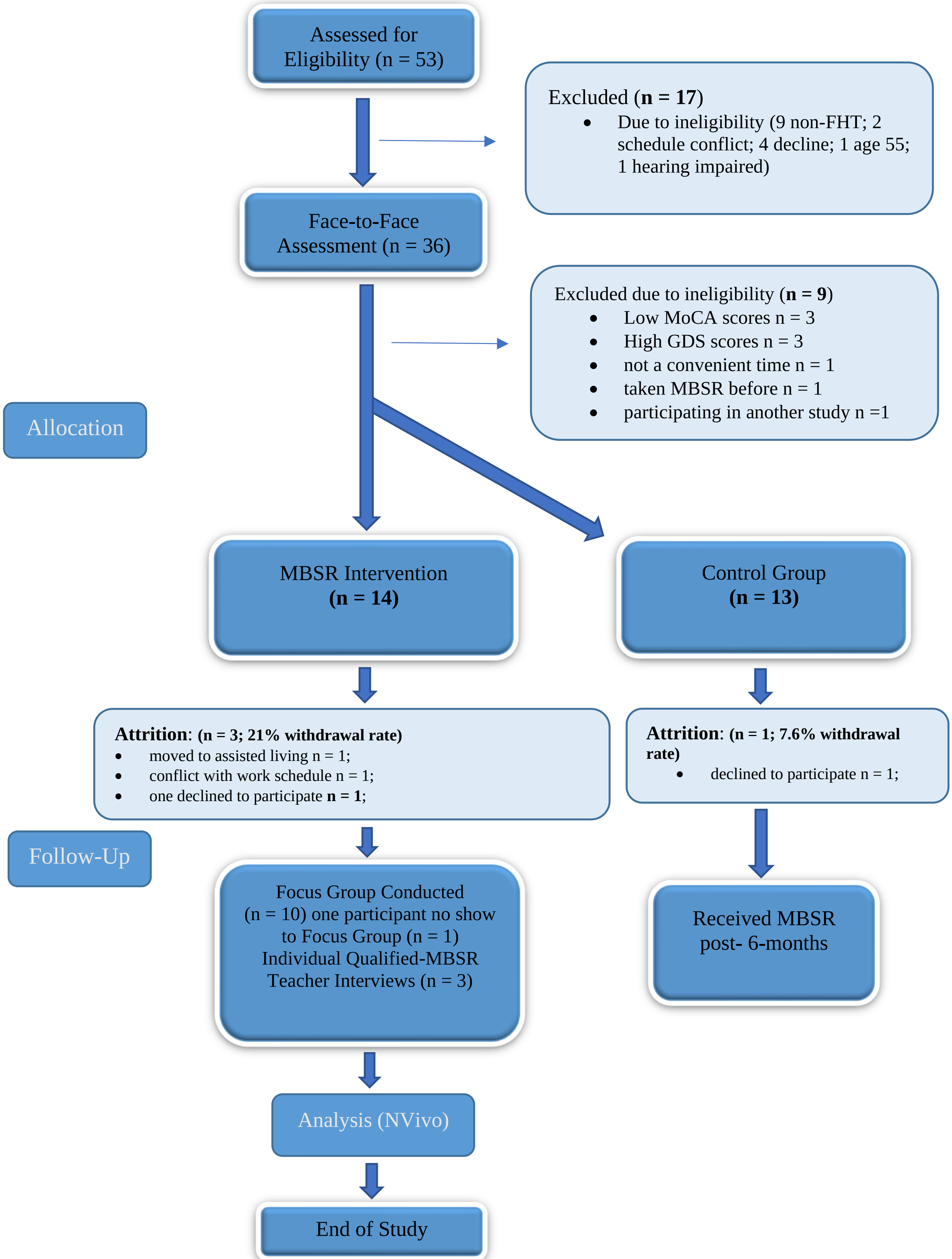
6. **Recruitment rates**

From April to August 2019 (4.5 months), 53 patients from the FHT expressed interest in participating in the study and were screened over the telephone by the PI of whom 36 were identified for a follow-up face-to-face screening (see Consort chart: **Figure 4.1** recruitment and retention of participants); 27 participants were ultimately selected and randomized, 14 to MBSR and 13 to the control group. Of note, over half of the recruitment occurred in July, the month before starting the program. (See **Table 4.4** for recruitment data). The recruitment rate of 27 participants was 90% of our targeted recruitment rate of 30 plus participants. Based on the recruitment period of four and a half months, our study's recruitment rate averaged about six randomized participants per month. The enrollment rate or willingness of participants to be recruited was thus 27/36, or 75%**.**

Table 4.4 – Recruitment rates

Recruitment Rates (April – August 2019)	April **0**	May **13**	June **9**	July **24**	August **7**	**Total** **53**
	0%	24.5%	17.0%	45.3%	13.2%	100%
Randomized	**0**	**5**	**6**	**14**	**2**	**27**
	0%	18.5%	22.2%	51.9%	7.4%	100%

Figure 4.1: Recruitment and retention of participants



2. Retention Rates

Following randomization, three participants assigned to the MBSR group withdrew ([participant #25] dropped out before the intervention began, due to a lack of time to participate in the MBSR program fully, and another two completed parts of the program but withdrew at Week-2, [participant #4] due to conflict with their work schedule and Week-3, [participant #17] had to move to a retirement home]) for a withdrawal rate of 21.4% (3/14) and a moderate retention rate of 64.3% (9/14 attended ≥ 6 of the 10 sessions, including the All-Day and Orientation). However, excluding those three participants who withdrew early in the MBSR program, the retention rate was 81.8% (9/11 who attended ≥ 6 of the 10 weekly sessions, including the All-Day and Orientation). **See Table 4.5.** Therefore, 78.5% (11/14) of participants completed the program to its entirety, regardless of the number of sessions attended. In addition, 100% of participants returned the tablets or CDs and self-reported home diaries at Week-13 follow-up.

3. Adherence Rates Data

(i) Adherence rates (tablets only; n = 10): five out of 10 or 50% of participants using tablets met the criteria of 39 logins (3 x 13 weeks), while four out of 10 or 40% met both the 39 logins criteria and the formal home practice criteria of ≥ 19.5 hrs (1.5 hrs x 13 weeks; 1,170 mins). Thus, the number of participants who met the criteria for both the 39 logins and the formal home practices of ≥ 19.5 hrs (≥ 1,170 mins) was (4/10) or 40%, a low adherence rate. Excluding those who withdrew, the adherence would have been four out of eight or 50%.

(ii) True adherence rates (tablets and CDs; *n* = 14): seven out of 14 participants achieved both attendance cut-off (attending ≥ 6 sessions) and home practice (formal *and* informal practice) completion cut-off at 19.5 hrs (1,170 mins) for the whole duration of the study, giving a 50% true adherence rate which is considered to be low, but excluding participants who withdrew early on in the program, the true adherence rate would have been a moderately successful 63.6% (7/11) rate overall (Anderson et al., 2018). Of note, one participant with Wi-Fi access preferred using CDs rather than tablet for formal home practice.

(iii) Duration of formal home practice: For the 13 weeks of the study, the eight participants using tablets only practiced for 1.60 hrs or 96.4 minutes (SD = 61.1) a week (e.g., 16 mins per day, six days per week) on average after class. In comparison, we requested the same participants (n = 8) to log their formal home practice data using pen and paper. It was determined that those participants (using tablets) practiced for 131.6 mins (SD = 68.8) a week for 13 weeks (e.g., 22 mins per day, 6 days per week) after class. The discrepancy between participants logging their home practice using the tablet technology versus pen and paper documentation resulted in inflation by approximately 6 minutes/day or 27%, demonstrating an acceptable discrepancy.

Objectives 1(b): Acceptability of Technology

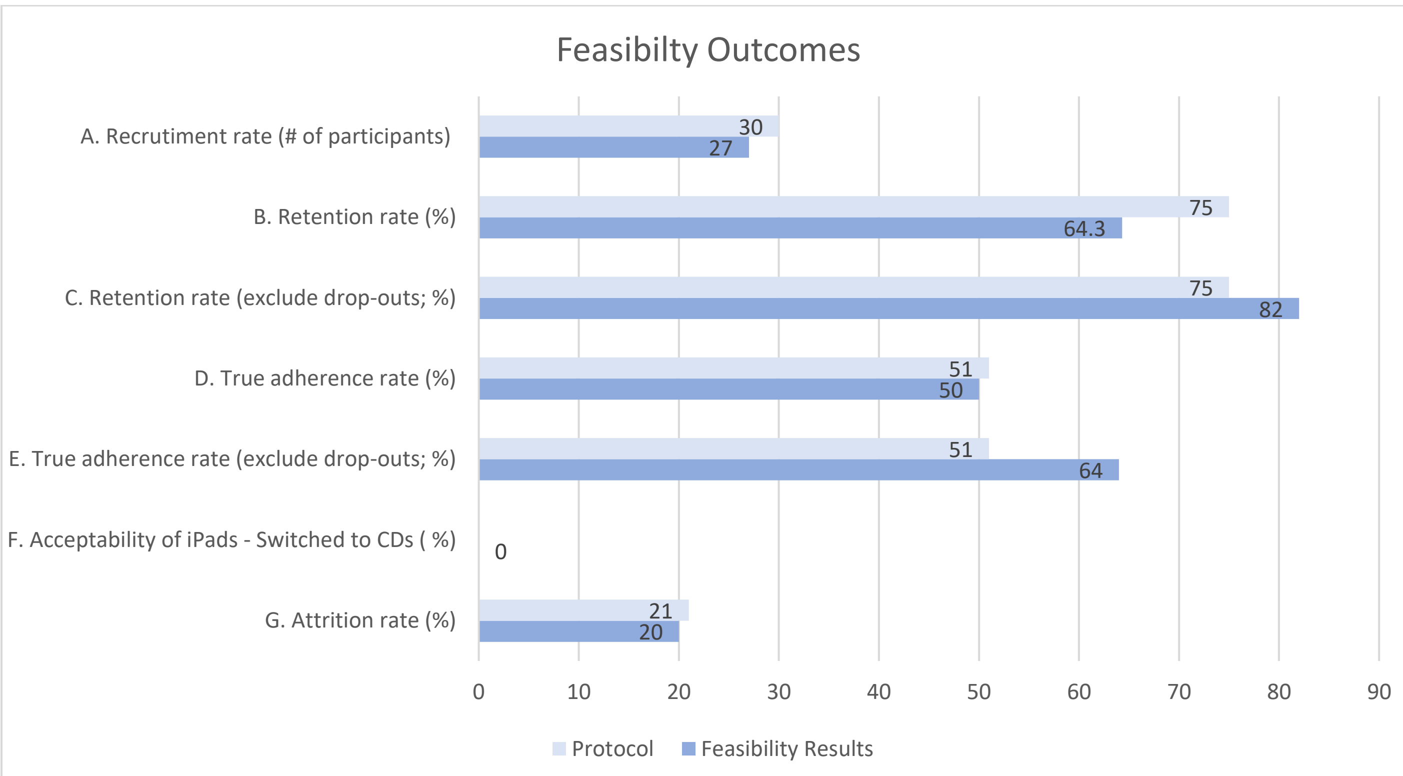
(i) Field notes by qualified-MBSR teachers noted that in terms of participation with technology, it was necessary to familiarize participants with the tablets and/or provide any technical support. Technical support was provided before or after the first few sessions. Two participants telephoned the PI for basic support to access the App's home practices; however, little to no technical support was required towards the end of the program. Furthermore, technology use did not affect participating in the group.

The qualified-MBSR teachers noted that most if not all participants were engaged, involved in group discussions, came prepared and were on time.

(ii) No participants who used tablets switched to low technology; for example, those who started using tablets for home practice continued doing so until the study's end.

(iii) The results of the focus group at the end of the MBSR program are outlined in **Table 4.6**. Theme 3, *connecting to the world* highlighted the acceptability of tablet use.

Table 4.5 – Feasibility outcomes



Qualitative Findings

Three significant themes emerged from the focus group and occupational therapists' interviews i) The unique features of primary care, ii) Satisfaction and perceived benefits of MBSR and iii) Connecting with the world. MBSR participants are identified by participant identification number (P#) and age (e.g., P#11, age 61), while the three occupational therapists are represented as OTs #1, #2 or #3.

Table 4.6 – Major themes and sub-themes

Themes and Subthemes	Sample Quotes
Theme 1: Unique Features of Primary Care	
Trust and feeling safe with staff and institution	(P#11, age 61) "I trust this setting. I trust the people [staff] here." OT #3) "there was a sense of trust; trust came up a lot for people that it felt kind of safe..."
Collaborative team-based care	OT #2) "it's beneficial to have a connection to family physicians, other members of the team, and being able to provide care in a way that there is more collaboration and more team communication between the team members…"
Theme 2: Satisfaction and Perceived Benefits	
Mental health benefits	(P#21, age 60), "seeing benefits in my state of relaxation and reactions to daily issues." (P#16, age 68), "I found it was calming … makes me feel emotionally better." (P#18, age 61) , "There has been a change in my mental karma, it is now more peaceful."
Social Support	(P#2, age 82) ".. we end up caring about each other and taking care of each other..." (OT #3), "I think the group alone provided a sense of social support, and community for people"
Personal insights on self-care	OT #1) "across the board for most people was this realization of the need for self-kindness, self-care..."
Responding differently versus reacting	(P#7, age 79), "I'm not following my former habits. I'm sick of falling into that hole... Quicker recovery. Less ruminating."
Adoption mindfulness practice to day-to-day activities	(P#16, age 68), "I find it easier to do [breathing] whenever I am waiting for someone or something". (P#27, age 60), "I loved the walking one. I never thought about walking being as complex and difficult as it is."
An alternative to medication(s)	(P#27, age 60), "I think eventually this will make some of my other pills go away."
More than memory, other benefits	(P#11, age 61), " ..This class teaches you more than memory. This is kind of like a change…on how to live your life. And it came for me in a very opportune time."

Theme 3: Connecting to the World	
Acceptability of technology	(P#16, age 68), "I'm not afraid of technology." (P#23, age 74), "I am grateful for the opportunity to learn to use the iPad." (P#11, age 61), "I think seniors are natural to technology actually."
Portability of technology	(P#27, age 60), "I found that it was so portable…" OT #2) "It's portable- this particular size of the device… [and] …very accessible at the touch of a button."
Minimum barriers around technology	(P#23, age 74), "I was away up in a trailer for a while. And you know the CDs were helpful there, cause I didn't have the Wi-Fi."
The importance of support in place for technology	(P#2, age 82), "But there was also help – I had – a problem.. and it got fixed – you had a problem, and it got fixed. Mine got stuck in a place where I couldn't figure it out. Well, actually a couple of times I had to call up [PI] and say, 'What's going on?'" (P#23, age 74), "I don't use that much technology, so using the iPad was new for me. And I had some difficulties at the beginning.." (OT #2), "a lot of questions- they were very simple questions… it was pretty much just how to use the app or how to log into the internet."

Theme 1: Acceptability/Unique Features of Primary Care

Many participants expressed how they trusted and felt safe with FHT staff and the institution. The MBSR teachers also noticed the theme of trust and safety. Participants with SCD or MCI reported that they "felt safe" or "very safe," as they had pre-established relationships with other team members and their team physician. In an interprofessional primary care setting with many different providers, patients can access a wide range of programming and feel a sense of trust in these programs. As described by one participant (P#13, age 68), "I was recommended to this program by my doctor; she listened to me and recommended [this program]," demonstrating the collaborative nature of primary care. Patients can also self-refer themselves as services are advertised in the FHT waiting room, e.g., television, flyers etc. One participant (P#7, age 79) said, "I saw these flyers on the third floor… and then I went, 'Oh my god, this is exactly what I need because… I thought well maybe this will help" which describes a growing potential need within this population in primary care, in which patients can self-refer in an interprofessional primary care setting. Sample quotations are found in **Table 4.6**.

Theme 2: Satisfaction and Perceived Benefits of MBSR

Participants described their perceived benefits and satisfaction based on the following subthemes: i.) mental health benefits, ii.) social support iii.) personal insights on self-care, iv.) responding differently vs. reacting, v.) adoption of mindfulness practice to everyday activities, vi.) alternative to medication(s), and vii.) more than memory.

Participants described their perceived value and satisfaction with the MBSR program by describing high satisfaction with mental health benefits, reporting "feeling more relaxed," "emotionally better," "peaceful," "calm," and "getting in touch with one's emotions." There was also the added benefit of social support, which decreased social isolation or loneliness, especially for those living with SCD or MCI. One participant noted the group "allowed us to connect (P#16, age 68)", and another that, "it keeps me connected throughout the week (P#23, age 74)". The MBSR group also provided personal insights into "self-care". It was noted by OT#1 that, "for most people was this realization the need for self-kindness, self-care, self-compassion (OT#1)". One participant realized that, with ageing and living with cognitive issues, "…you have to take different ways… to take care of yourself now (P#16, age 68)", and another participant stated that, "self-acceptance is self-care… and perhaps most of us have not really thought about it that way before (P#2, age 82)."

A subtheme emerged was learning to have a different approach to stress by responding differently versus reacting. Most participants developed an increase in awareness and paying attention to stress reactivity which promotes recovery from stressful situations faster and with less rumination. As mentioned by a participant, "I'm not following my former habits. I'm sick of falling into that hole. Quicker recovery. Less ruminating" (P#7, age 79). With mindfulness practice, there is a component of incorporating it into everyday activities noted by a participant who stated, "I find it easier to do [breathing] whenever I am waiting for someone or something (P#16, age 68)" by using opportunities in the day to do a quick mindfulness practice. Another participant would make a grocery list, but forgets it at home and said, "I focus on what I'm writing… I don't have the list with me, so it's making me think more and be aware of myself, listening… and developing more strategies (P#13, age 68)". Participants also spoke about how mindfulness can broadly support their health and as an alternative to medications. One participant mentioned that, "… I've had issues with my back, and I was taking all these medications, and they were making me feel worse! (P#13, age 68)" and another participant said similar sentiment by saying, "I think eventually this will make some of my other pills go away (P#27, age 60)."

Lastly, participants stated that the program was more than memory as it gave them tools to approach life from a different perspective. As mentioned by a participant, "this class teaches you more than memory. This is kind of like a change… on how to live your life. And it came for me in (sic) a very opportune time (P#16, age 68)". The program is about learning to pay attention, and one participant stated, “my listening skills are much better… [mindfulness practice] makes me focus… (P#13, age 68)” noticing an improvement in listening and focusing, which is a cognitive benefit. To summarize, an older participant expressed intense appreciation for the group and said, “…I think we need more programs like this. (P#8, age 86)”.

Theme 3: Acceptability of Technology, Connecting with the World

Participants and occupational therapists described using iPads for home practice as i.) acceptable, ii.) portable, iii.) involving minimal barriers and iv.) demonstrating importance of supports in learning how to use technology in the MBSR program.

OT#1 noticed participants’ enthusiasm and receptiveness to technology, stating, “They’re in love with technology! They’re open to it…”. Many participants echoed similar sentiments and were “grateful for the opportunity to learn to use the iPad (P#23, age 74)”. Secondly, OT#2 described computer tablets as, as portable and therefore accessible for home practice because of their “particular size of the device… [and] …very accessible at the touch of a button”. Participants noted that they could use their headphones and do a practice in any room of their home. The only two minor barriers from participants’ perspectives on technology use included the learning curve and access to Wi-Fi when outside their homes. Lastly, it is important to ensure that assistance is available and integral to support participants’ success in learning and using technology independently. No participants raised any challenges about the program or identified any barriers to the acceptability of the technology.

Discussion

In this convergent mixed-methods, single-blind, pilot RCT we demonstrated that a 9-week occupational therapy-led MBSR program was feasible for practice among community-dwelling, older adult primary care patients living with SCD or MCI. However, based on the lower-than-expected rates of recruitment, retention, and adherence, our study as designed did not meet the feasibility bench marks that were set. However, with minor modifications to the design, including changing how participants who drop-out are analyzed, extending recruitment, adding multiple sites, this intervention would be well suited to further study using a full-scale RCT.

Following our research protocol, we used last observation carried forward (LOCF) method to manage dropouts. As such, since three participants withdrew early from the study for reasons unrelated to the MBSR program, the retention rate was below our specified 75-80% benchmark because a small number of dropouts impacted our results based on the LOCF approach used in our protocol. Excluding participants who withdrew, the study's retention rate would have been higher. Similarly, the study had low adherence and true adherence rates but, excluding participants who withdrew early, the true adherence rate would have been moderate, compared to other mindfulness adherence studies (Canby et al., 2021). Additionally, participants who remained in the intervention group to its entirety remained committed despite the substantial time commitment. Lastly, although our study's feasibility outcomes were lower than expected, a high number of participants completed the entire MBSR program, and we had a high follow-up rate in an FHT. Based on our findings, it is recommended that a future trial may consider using an alternative LOCF method, as we noted that dropouts significantly impacted our rates of retention and adherence. Second, the recruitment period (4.5 months) should be longer or the MBSR program offered at multiple primary care sites to obtain a larger sample size.

As the study proceeded, we made two changes to the original study protocol. The first change was to modify the inclusion criteria to clarify how MCI was determined. An MCI diagnosis in the EMR would meet the study's eligibility, but in cases where there was no MCI confirmation in the EMR, but a participant's MoCA score was within 20-25, we used Horton's et al.'s (2015) MCI criteria for eligibility (Horton et al., 2015, Petersen et al., 2014). Second, we changed the retention rate, from completing 6 ≥ of the 9 sessions to 6 ≥ of the 10 sessions to capture the orientation session, resulting in a moderate retention rate of 64.3% (9/14), although it was below our specified 75-80% benchmark. If the orientation session was excluded as per our original study protocol, it would have been a lower retention rate of 50% (7/14 attended ≥ 6 of the 9 sessions). The decision to include the orientation session in our retention rate was because it was similar in structure to the other weekly sessions (provided in a three-hour group format). In contrast, other MBSR studies conducted a one-hour orientation session individually and right after the randomization process or did not provide a description of their orientation session (Alsubaie et al., 2018; Juul et al., 2020).

Our findings are consistent with the growing body of literature on the benefits of mindfulness-based interventions in primary care (Demarzo et al., 2015). However, we only achieved 90% of our targeted 30 plus participants. To achieve our recruitment target, the recruitment period would need to be extended from 4.5 months to at least six months or to include multiple primary care sites to achieve a larger sample size and the recruitment rate
Our study also supports other recent RCT findings that MBSR is feasible for practice and is an optimal early intervention for the SCD population (Marchant et al., 2021; Smart et al., 2016; Wetherell et al., 2017). Our analysis also demonstrated that using technology such as computer tablets for program delivery was feasible and highly acceptable to our participants living with

cognitive complaints. Based on our results, embedding the use of this technology in a primary care setting such as an FHT would be viable. As the numbers of community-dwelling older adults with SCD or MCI increase in the coming years, strategies that support their functional and psychosocial needs, especially from a non-pharmacological perspective, are critical.

There is currently limited information on the types of healthcare services provided to older adults with SCD or MCI in interprofessional primary care settings. For example, a national survey by Donnelly et al. (2016) has shown that 57% of occupational therapists' caseload in primary care involves providing support to older adults. Health promotion and prevention-related activities (75%) followed by group-based interventions (14%) were the most frequently described interventions in this setting (Donnelly et al., 2016), and this aligns well with our study noting the benefits of such an occupational therapy-led MBSR group. A study by Mirza et al. (2020) determined that an occupational therapy group-based intervention in primary care was feasible, acceptable and highly satisfying to older adults living with chronic conditions (Mirza et al., 2020) which further supports our findings. These findings are consistent with many other studies showing that an occupational therapist-led MBSR is feasible for practice among participants with MCI or mild dementia (Wang et al., 2020), as demonstrated by the qualitative data of the focus group and noting low attrition; high completion; and a 100% follow-up. Further, excluding those three participants who withdrew, the results demonstrate moderate true adherence rates along with high retention rates.

Our qualitative investigation found that MBSR program supports individuals with cognitive complaints such as SCD or MCI through a broad range of positive effects, such as mental health benefits of group process including "social support" and "feeling safe." These findings were consistent with a mixed-methods study by Berk et al. (2018), which found similar themes in a group process among middle-aged and older adults with memory complaints while attending an MBSR program (Berk et al., 2017). Other studies have noted a reduction in worrying about memory complaints (Berk et al., 2017) and increased memory self-efficacy following MBSR (Smart et al., 2016). Also, our study participants gained more insights into how to manage their everyday lives. Perhaps future, more extensive trials may consider evaluating the impact of incorporating MBSR programs within this population's everyday life participation. Consistent with the literature, there were no noted adverse events (Kor et al., 2019; Wahbeh et al., 2016).

Embedding MBSR in a primary care setting may effectively meet the complex and unique needs of this population by supporting and managing their health care needs, including psychosocial support. The unique feature of collaborative practice in primary care is communication between providers. With this collaborative practice, it is developing a partnership between interprofessional primary care providers and patients to negotiate and navigate their health care needs. This results in patients establishing a more personal connection with interprofessional primary care providers on the team. Feelings of trust and safety are pre-established elements that can be leveraged for adopting such a program in an interprofessional primary care setting.

Participants with SCD or MCI were open and receptive to and were capable of learning how to use computer tablets. This receptiveness was demonstrated in Wahbeh et al.'s study (2016), where they found a high recruitment rate (75%) and acceptability of an internet-based mindfulness meditation intervention for cognition and mood among older adults. However, Wahbeh et al's. (2016) study contradicts ours slightly; they stated that it was too difficult for older adults to use iPads or iPod touch and they had to be switched over to participants' desktop and laptop computers if they owned them. The Wahbeh et al. (2016) study is six years old (and the data is potentially older) which could explain the discrepancies as older adults are becoming more and more proficient with using technology. Wahbeh et al. (2016) also recommended that older adults need some basic knowledge of computers and how they work and to have their own computers to access online programs. Only 38% (3/8) of our study participants who used the tablets had minor issues accessing the App or Wi-Fi access. However, once support was provided, they independently used the tablets thereafter. Providing technological support in the initial phase of the study was crucial. The literature supports the importance of providing assistance with technology and that technology-based instructions require a high structure environment along with ensuring helpful resources are readily available (Wolfson et al., 2014) to ensure successful use of technology. It could be argued that participants who had Wi-Fi in their homes or who own smartphones were more receptive to and comfortable with using technology as demonstrated by eight out of 10 or 80% of participants choosing tablets. The provision of access to Wi-Fi in our study for tablet use provided valuable insight into the acceptability of technology for MBSR program delivery and data collection. However, we found that being flexible and inclusive of participants' comfort levels by also offering a CD option for home practice is an important factor to ensure that participants fully participate in the MBSR program. Technology-based mindfulness programs are on the horizon for older adults. Choo et al. (2018) reported on the potential use of a smartphone App to deliver mindfulness interventions to older Asian adults at risk for suicide (Choo et al., 2018). In another study, Ungar et al. (2019) used an online mindfulness program that was greatly beneficial to lonely older adults (Ungar et al., 2019). The literature exemplifies a growing use of technology to support older adults to "age-in-place." The qualitative data from our focus group and interviews with the occupational therapists, validates embedding technology in an interprofessional primary care setting. Future studies could explore the use of technology in primary care program delivery and research.

A recent systematic review and meta-analysis of 43 interventional mindfulness studies by Parsons et al. (2017) found that average home practice was 180 minutes (SD = 43) a week (e.g., 30 minutes per day, six days a week) among participants (general adults). In our study, based on the direct measure (i.e., tablets), participants practiced for 96.4 minutes/week (SD = 61.1) at home (e.g., 16 minutes per day on average). However, based on the subjective self-report measure (i.e., home practice diary), participants practiced for 131.6 mins (SD = 68.8) a week for 13 weeks (e.g., 22 min per day, six days per week on average) outside of class time. This demonstrates approximately 6 minutes or about 27% inflation in subjective self-report (i.e., home practice diaries). This study is consistent with the literature reporting a discrepancy between direct versus subjective self-reported measures (Prince et al., 2008). Nevertheless, since there only appears to be a 6-minute discrepancy, it could be argued that participants in our study were acceptable accuracy with their self-reporting. In a study by Wahbeh et al. (2016), iPad/iPod was used, but participants were not asked to report their analysis of home practice frequency and duration of practice per day for their mindfulness-based internet intervention. Thus, to the author's knowledge, this is the first study to describe the use of direct measures using tablets to collect formal home practice versus subjective self-report measures (i.e., home practice diary) in an MBSR program. Secondly, to our knowledge, there is no home practice data in the literature of older adults living with cognitive complaints for comparison at present.

Direct measure (i.e., tablet) does come with limitations and consideration of using subjective self-reporting may be worthwhile to include in the overall evaluation of home practice data. The adherence rate of completing formal home meditation practice on tablets was 40% (4/10), as opposed to the higher true adherence rate which was 50% that also captured informal homework practices or behavioural change. Informal practices such as deliberately adopting attention to everyday activities and noticing the experience (e.g., walking, eating, washing dishes, etc.) are important. The lower adherence rate was accounted for by situations when participants could not capture home practice data. For example, one participant did not have Wi-Fi access when she was at her cottage, while other participants travelled during the summer months without their tablets for fear of damaging or losing them. Self-reported home practice dairy sheets were, therefore, necessary to determine the true adherence rate. The true adherence rate is essential since attending weekly MBSR sessions alone is insufficient. Excluding participants that withdrew, the higher true adherence rate positively reflects participants' high level of engagement and adherence to the MBSR program, and it also validates their overall practice quality (Del Re et al., 2013). Parsons et al. (2017) reported that participants' level of engagement with home practice is essential, and there was a statistically significant association between participants' home practice and the impact on health outcomes (Parsons et al., 2017).

Some minor barriers in this tablet-based practice included lack of reliable or general Wi-Fi access, which was similarly noted by Schepens et al. (2018), where unreliable Wi-Fi made it difficult at times in carrying out the intervention (Schepens et al., 2018). Only two participants in the intervention group did not have home Wi-Fi and needed CDs for their home practice. However, one participant with Wi-Fi access preferred using CDs rather than tablet for formal home practice. Those participants who used tablets required help during the first few sessions, but thereafter, all could conduct their home practices independently. Research on technology acceptance by community-dwelling older adults has emerged.   Our study showed that older adults living with SCD or MCI are highly receptive to learning how to use technology, and future group intervention programs in interprofessional primary care settings may also incorporate tablet use.

Strengths and Limitations

To our knowledge, this is the first study that examined the feasibility and acceptability of technology use in an occupational therapist-led MBSR program for older adults living with cognitive complaints in a team-based primary care setting. The small sample size was drawn from one urban primary care site, and our participants were mainly of a higher socioeconomic status, and results may be different from a more socially disadvantaged group of older adults. Further, the focus group participants were only those who had completed the MBSR intervention and, thus, may be biased as they reported no negative experiences.

The norm is to have only two MBSR teachers but having two additional MBSR teachers in the study to support participants' technological issues may have impacted their experience and may not be feasible in a typical setting. In addition, only five participants (5/14) met the MCI criteria as two had a confirmed diagnosis of MCI, while the other three did not, but met the MCI eligibility based on Petersen's et al.'s (2016) criteria. Thus, this small number of participants with MCI may limit the findings of feasibility and acceptability of technology use for the MCI population. Furthermore, our retention rates and true adherence rates were higher when we excluded the three participants who left the study. Thus, a future randomized clinical trial should consider (i) an alternative design method if LOCF to manage drop-out and (ii) using multiple primary care sites to achieve a larger sample size to include participants from diverse socioeconomic backgrounds and to enhance the evaluation of the impact of changes in everyday life participation with MBSR.

Conclusion

Based on our lower-than-expected rates of recruitment, retention, and adherence we found that our study did not meet the feasibility benchmarks as proposed in the current research design. However, this study highlighted that MBSR is feasible for practice, in an older adult population with early cognitive impairment in an interprofessional primary care setting. A future RCT is recommended with changes to the design to account for the findings of this study. A future trial may consider using an alternative LOCF method, we noted that dropouts significantly impacted our rates of retention and adherence. Second, the recruitment period should extend beyond 4.5 months, or the program offered at multiple primary care sites to achieve a larger sample size and the desired recruitment rate.

Our participants reported on their satisfaction and perceived benefits from the qualitative data and there is much promise for this intervention as it is well aligned with the philosophies of primary care and team-based models. The study's findings uphold the acceptability and portability of technology and illustrate those persons with SCD or MCI are receptive to learning and using computer tablets. Thus, future group MBSR programs in primary care may adopt technology use with this population. This study adds to the sparse literature on types of health care delivery in an interprofessional primary care setting and the vital contribution of occupational therapy to better support individuals with complex health conditions compared with physician care alone. This study will inform future research for evidence-based, occupational therapy-focused interventions on how best to deliver care to older adults with cognitive complaints such as SCD or MCI in an interprofessional primary care setting.

References

Aguirre, E., Stott, J., Charlesworth, G., Noone, D., Payne, J., Patel, M., & Spector, A. (2017). Mindfulness-Based Cognitive Therapy (MBCT) programme for depression in people with early stages of dementia: study protocol for a randomised controlled feasibility study. *3*. Doi:10.1186/s40814-017-0143-x

Albert, M. S., Dekosky, S. T., Dickson, D., Dubois, B., Feldman, H. H., Fox, N. C., . . . Phelps, C. H. (2011). The diagnosis of mild cognitive impairment due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. *Dementia, 7*(3), 270. R

Alsubaie, M., Dickens, C., Dunn, B. D., Gibson, A., Ukoumunne, O. C., Evans, A., . . . Kuyken, W. (2018). Feasibility and Acceptability of Mindfulness-based Cognitive Therapy Compared with Mindfulness-based Stress Reduction and Treatment as Usual in People with Depression and Cardiovascular Disorders: a Three-Arm Randomised Controlled Trial. *Mindfulness, 11*(1), 30-50. Doi:10.1007/s12671-018-0999-8

Anderson, L. M., Leonard, S., Jonassaint, J., Lunyera, J., Bonner, M., & Shah, N. (2018). Mobile health intervention for youth with sickle cell disease: Impact on adherence, disease knowledge, and quality of life. *Pediatric blood & cancer, 65*(8), e27081-n/a. doi:10.1002/pbc.27081

Andreescu, C., & Varon, D. (2015). New Research on Anxiety Disorders in the Elderly and an Update on Evidence-Based Treatments. *Current Psychiatry Reports, 17*(7), 1-7. Doi:10.1007/s11920-015-0595-8

B.C.Guidelines. (2016). Cognitive Impairment: Recognition, Diagnosis and Management in Primary Care.

Baer, R. A., Carmody, J., & Hunsinger, M. (2012). Weekly Change in Mindfulness and Perceived Stress in a Mindfulness-Based Stress Reduction Program. *Journal of Clinical Psychology, 68*(7), 755-765. Doi:10.1002/jclp.21865

Belchior, P., Korner-Bitensky, N., Holmes, M., & Robert, A. (2015). Identification and assessment of functional performance in mild cognitive impairment: A survey of occupational therapy practices. *Australian Occupational Therapy Journal, 62*(3), 187-196. Doi:10.1111/1440-1630.12201

Berk, L., Hotterbeekx, R., van Os, J., & van Boxtel, M. (2017). Mindfulness-based stress reduction in middle-aged and older adults with memory complaints: a mixed-methods study. *Aging & Mental Health, 22*(9), 1113-1120. Doi:10.1080/13607863.2017.1347142

Bohlmeijer, E., Prenger, R., Taal, E., & Cuijpers, P. (2010). The effects of mindfulness-based stress reduction therapy on mental health of adults with a chronic medical disease: a meta-analysis. *J Psychosom Res, 68*(6), 539-544. Doi:10.1016/j.jpsychores.2009.10.005

Canby, N. K., Eichel, K., Peters, S. I., Rahrig, H., & Britton, W. B. (2021). Predictors of Out-of-Class Mindfulness Practice Adherence During and After a Mindfulness-Based Intervention. *Psychosomatic medicine, 83*(6), 655-664. Doi:10.1097/PSY.0000000000000873

Carson, N., Leach, L., & Murphy, K. J. (2018). A re-examination of Montreal Cognitive Assessment (MoCA) cutoff scores: Re-examination of MoCA cutoff scores. *International Journal of Geriatric Psychiatry, 33*(2), 379-388. Doi:10.1002/gps.4756

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology nursing forum, 41*(5), 545-547. Doi:10.1188/14.ONF.545-547

Choo, C. C., Kuek, J. H. L., & Burton, A. A. D. (2018). Smartphone Applications for Mindfulness Interventions with Suicidality in Asian Older Adults: A Literature Review. *Int J Environ Res Public Health, 15*(12). Doi:10.3390/ijerph15122810

Clarke, V., & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology*, *12*(3), 297-298. Doi:10.1080/17439760.2016.1262613

Crous-Bou, M., Minguillon, C., Gramunt, N., & Molinuevo, J. L. (2017). Alzheimer's disease prevention: from risk factors to early intervention. *Alzheimers Res Ther, 9*(1), 71. Doi:10.1186/s13195-017-0297-z

De Vriendt, P., Gorus, E., Cornelis, E., Velghe, A., Petrovic, M., & Mets, T. (2012). The process of decline in advanced activities of daily living: a qualitative explorative study in mild cognitive impairment. *International Psychogeriatrics, 24*(6), 1-13. Doi:10.1017/S1041610211002766

Del Re, A. C., Flückiger, C., Goldberg, S. B., & Hoyt, W. T. (2013). Monitoring mindfulness practice quality: An important consideration in mindfulness practice. *Psychotherapy research, 23*(1), 54-66. Doi:10.1080/10503307.2012.729275

Demarzo, M., Montero-Marin, J., Cuijpers, P., Zabaleta-del-Olmo, E., Mahtani, K. R., Vellinga, A., . . . García-Campayo, J. (2015). The Efficacy of Mindfulness-Based Interventions in Primary Care: A Meta-Analytic Review. *Annals of Family Medicine, 13*(6), 573-582. Doi:10.1370/afm.1863

Dhalwani, N. N., Fahami, R., Sathanapally, H., Seidu, S., Davies, M. J., & Khunti, K. (2017). Association between polypharmacy and falls in older adults: a longitudinal study from England. *BMJ Open, 7*(10), e016358. Doi:10.1136/bmjopen-2017-016358

Donnelly, C., Leclair, L. L., Wener, P. F., Hand, C. L., & Letts, L. J. (2016). Occupational therapy in primary care: Results from a national survey: L'ergothérapie dans les soins primaires : Résultats d'un sondage national. *The Canadian Journal of Occupational Therapy, 83*(3), 135. Doi:10.1177/0008417416637186

Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A. (2016). CONSORT 2010 statement: extension to randomised pilot and feasibility trials. *BMJ, 355*, i5239. Doi:10.1136/bmj.i5239

Fam, J., Sun, Y., Qi, P., Lau, R. C., Feng, L., Kua, E. H., & Mahendran, R. (2020). Mindfulness practice alters brain connectivity in community-living elders with mild cognitive impairment. *Psychiatry and clinical neurosciences, 74*(4), 257-262. Doi:https://dx.doi.org/10.1111/pcn.12972

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving Integration in Mixed Methods Designs-Principles and Practices. *Health services research, 48*(6pt2), 2134-2156. Doi:10.1111/1475-6773.12117

Goldberg, S. B., Tucker, R. P., Greene, P. A., Davidson, R. J., Kearney, D. J., & Simpson, T. L. (2019). Mindfulness-based cognitive therapy for the treatment of current depressive symptoms: a meta-analysis. *Cognitive behaviour therapy, 48*(6), 445-462. Doi:https://dx.doi.org/10.1080/16506073.2018.1556330

Gu, J., Strauss, C., Bond, R., & Cavanagh, K. (2015). How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review, 37*, 1-12. Doi:10.1016/j.cpr.2015.01.006

Hadi, M. A., & José Closs, S. (2016). Ensuring rigour and trustworthiness of qualitative research in clinical pharmacy. *International Journal of Clinical Pharmacy, 38*(3), 641-646. Doi:10.1007/s11096-015-0237-6

Hazlett-Stevens, H., Singer, J., & Chong, A. (2018). Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy with Older Adults: A Qualitative Review of Randomised Controlled Outcome Research. *Clinical Gerontologist, 42*(4), 347-358. Doi:10.1080/07317115.2018.1518282

Health Quality Ontario. (2012). Learning community: Advancing Improvement in primary care in Ontario. Retrieved from http://www.hqontario.ca/Portals/0/documents/qi/pc-team-building-guide-intro-en.pdf

Horton, D. K., Hynan, L. S., Lacritz, L. H., Rossetti, H. C., Weiner, M. F., Cullum, C. M. (2015). An Abbreviated Montreal Cognitive Assessment (MoCA) for Dementia Screening. *Clinical neuropsychologist, 29* (4), 413–425. https://doi.org/10.1080/13854046.2015.1043349.

Huang, H. P., He, M., Wang, H. Y., & Zhou, M. (2016). A meta-analysis of the benefits of mindfulness-based stress reduction (MBSR) on psychological function among breast cancer (BC) survivors. *Breast Cancer, 23*(4), 568-576. Doi:10.1007/s12282-015-0604-0

Jam, S., Imani, A. H., Foroughi, M., SeyedAlinaghi, S., Koochak, H. E., & Mohraz, M. (2010). The effects of mindfulness-based stress reduction (MBSR) program in Iranian HIV/AIDS patients: a pilot study. *Acta Med Iran, 48*(2), 101-106. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/21133002

Jessen, F., Amariglio, R. E., Buckley, R. F., van der Flier, W. M., Han, Y., Molinuevo, J. L., Rabin, L., Rentz, D. M., Rodriguez-Gomez, O., Saykin, A. J., Sikkes, S. A. M., Smart, C.

M.; Wolfsgruber, S., Wagner, M. (2020). The Characterisation of Subjective Cognitive Decline. *Lancet neurology, 19*(3), 271–278. https://doi.org/10.1016/S1474-4422(19)30368-0.

Johansson, M. M., Marcusson, J., & Wressle, E. (2015). Cognitive impairment and its consequences in everyday life: experiences of people with mild cognitive impairment or mild dementia and their relatives. *International psychogeriatrics / IPA, 27*(6), 949-958. Doi:10.1017/S1041610215000058

Joosten-Weyn Banningh, E. W. A., Vernooy-Dassen, M. J. F. J., Olde Rikkert, M. G. M., & Teunisse, J. P. W. M. (2008). Mild cognitive impairment: coping with an uncertain label. *International Journal of Geriatric Psychiatry, 23*(2), 148-154. Doi:10.1002/gps.1855

Juul, L., Pallesen, K. J., Bjerggaard, M., Nielsen, C., & Fjorback, L. O. (2020). A pilot randomised trial comparing a mindfulness-based stress reduction course, a locally-developed stress reduction intervention and a waiting list control group in a real-life municipal health care setting. *BMC public health, 20*(1), 409-409. Doi:10.1186/s12889-020-08470-6

Kabat-Zinn, J., & University of Massachusetts Medical Center/Worcester. Stress Reduction, C. (2009). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness* (Delta trade pbk. Reissue, 15th anniversary ed.). New York, N.Y: Delta Trade Paperbacks.

Khoury, B., Sharma, M., Rush, S. E., & Fournier, C. (2015). Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *Journal of psychosomatic research, 78*(6), 519-528. Doi:10.1016/j.jpsychores.2015.03.009

Knopman, D. S., & Petersen, R. C. (2014). Mild cognitive impairment and mild dementia: a clinical perspective. *Mayo Clinic proceedings, 89*(10), 1452-1459. Doi:10.1016/j.mayocp.2014.06.019

Kok, R. M., & Reynolds, C. F. (2017). Management of Depression in Older Adults: A Review. *JAMA, 317*(20), 2114-2122. Doi:10.1001/jama.2017.5706

Kor, P. P. K., Liu, J. Y. W., & Chien, W. T. (2019). Effects of a modified mindfulness-based cognitive therapy for family caregivers of people with dementia: A pilot randomised controlled trial. *International journal of nursing studies, 98*, 107-117. Doi:10.1016/j.ijnurstu.2019.02.020

Marchant, N. L., Barnhofer, T., Coueron, R., Wirth, M., Lutz, A., Arenaza-Urquijo, E. M., . . . The Medit-Ageing Research, G. (2021). Effects of a Mindfulness-Based Intervention versus Health Self-Management on Subclinical Anxiety in Older Adults with Subjective Cognitive Decline: The SCD-Well Randomised Superiority Trial. *Psychotherapy and Psychosomatics, 90*(5), 341-350. Doi:https://dx.doi.org/10.1159/000515669

Marciniak, R., Šumec, R., Vyhnálek, M., Bendíčková, K., Lázničková, P., Forte, G., . . . Sheardová, K. (2020). The Effect of Mindfulness-Based Stress Reduction (MBSR) on Depression, Cognition, and Immunity in Mild Cognitive Impairment: A Pilot Feasibility Study. *Clinical interventions in aging, 15*, 1365-1381. Doi:10.2147/CIA.S249196

Mirza, M., Gecht-Silver, M., Keating, E., Krischer, A., Kim, H., & Kottorp, A. (2020). Feasibility and Preliminary Efficacy of an Occupational Therapy Intervention for Older Adults With Chronic Conditions in a Primary Care Clinic. *The American journal of occupational therapy, 74*(5), 7405205030-7405205030p7405205013. Doi:10.5014/ajot.2020.039842

Montoro-Membila, N., Arnedo Montoro, M., Funes, M. J., & Rodríguez-Bailón, M. (2021). The Cognitive Scale of Basic and Instrumental Activities of Daily Living for Multidomain Mild Cognitive Impairment and Dementia Patients: Validation of its Extended Version. *Journal of the International Neuropsychological Society*, 1-14. Doi:10.1017/S1355617721000758

Moraros, J., Nwankwo, C., Patten, S. B., & Mousseau, D. D. (2017). The association of antidepressant drug usage with cognitive impairment or dementia, including Alzheimer disease: A systematic review and meta-analysis. *Depress Anxiety*, *34*(3), 217-226. Doi:10.1002/da.22584

Ni, Y., Ma, L., & Li, J. (2020). Effects of Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy in People With Diabetes: A Systematic Review and Meta-Analysis. *Journal of nursing scholarship*, *52*(4), 379-388. Doi:10.1111/jnu.12560

Park, M. H. (2017). Informant questionnaire on cognitive decline in the elderly (IQCODE) for classifying cognitive dysfunction as cognitively normal, mild cognitive impairment, and dementia. *International Psychogeriatrics, 29*(9), 1461-1467. Doi:10.1017/S1041610217000965

Parsons, C. E., Crane, C., Parsons, L. J., Fjorback, L. O., & Kuyken, W. (2017). Home practice in Mindfulness-Based Cognitive Therapy and Mindfulness-Based Stress Reduction: A systematic review and meta-analysis of participants' mindfulness practice and its association with outcomes. *Behav Res Ther*, *95*, 29-41. Doi:10.1016/j.brat.2017.05.004

Petersen, R. C. (2016). Mild Cognitive Impairment. *CONTINUUM: Lifelong Learning in Neurology*, *22*(2, Dementia), 404-418. Doi:10.1212/CON.0000000000000313

Petersen, R. C., Caracciolo, B., Brayne, C., Gauthier, S., Jelic, V., Fratiglioni, L., . . . Stressforskningsinstitutet. (2014). Mild cognitive impairment: a concept in evolution. *Journal of Internal Medicine, 275*(3), 214-228. Doi:10.1111/joim.12190

Prince, S. A., Adamo, K. B., Hamel, M., Hardt, J., Connor Gorber, S., & Tremblay, M. (2008). A comparison of direct versus self-report measures for assessing physical activity in adults: a systematic review. *The international journal of behavioral nutrition and physical activity, 5*(1), 56-56. Doi:10.1186/1479-5868-5-56

Reid, L. M., & MacLullich, A. M. J. (2006). Subjective Memory Complaints and Cognitive Impairment in Older People. *Dementia and Geriatric Cognitive Disorders, 22*(5-6), 471-485. Doi:10.1159/000096295

Rotenberg, S., Maeir, A. Dawson, D. (2020). Changes in Activity Participation Among Older Adults With Subjective Cognitive Decline or Objective Cognitive Deficits. *Frontiers in neurology*, *10*, 1393–1393. https://doi.org/10.3389/fneur.2019.01393.

Schepens Niemiec, S. L., Blanchard, J., Vigen, C. L. P., Martínez, J., Guzmán, L., Concha, A., . . . Carlson, M. (2018). Evaluation of ¡Vivir Mi Vida! To improve health and wellness of rural-dwelling, late middle-aged Latino adults: results of a feasibility and pilot study of a lifestyle intervention. *Primary Health Care Research & Development, 19*(5), 448-463. Doi:10.1017/S1463423617000901

Sepehry, A. A., Lee, P. E., Hsiung, G. Y. R., Beattie, B. L., & Jacova, C. (2012). Effect of selective serotonin reuptake inhibitors in Alzheimer’s disease with comorbid depression: a meta-analysis of depression and cognitive outcomes. *Drugs & aging, 29*(10), 793.

Shim, M., Tilley, J. L., Im, S., Price, K., & Gonzalez, A. (2021). A Systematic Review of Mindfulness-Based Interventions for Patients with Mild Cognitive Impairment or

Dementia and Caregivers. *Journal of geriatric psychiatry and neurology, 34*(6), 528-554. Doi:https://dx.doi.org/10.1177/0891988720957104

Smart, C. M., Segalowitz, S. J., Mulligan, B. P., Koudys, J., & Gawryluk, J. R. (2016). Mindfulness Training for Older Adults with Subjective Cognitive Decline: Results from a Pilot Randomised Controlled Trial. *Journal of Alzheimer's disease 52*(2), 757.

Timer, I. (2019). Insight Timer.

Tran, T., Donnelly, C., Nalder, E. J., Trothen, T., & Finlayson, M. (2020). Occupational therapist-led mindfulness-based stress reduction for older adults living with subjective cognitive decline or mild cognitive impairment in primary care: a feasibility randomised control trial protocol. *BMJ Open, 10*(6), e035299. Doi:10.1136/bmjopen-2019-035299

Ungar, R., Wu, L., Keown, K., Schaeffer, J., & Wicker, E. (2019). ONLINE MINDFULNESS PROGRAM FOR LONELY OLDER ADULTS. *Innovation in aging, 3*(Supplement_1), S185-S185. Doi:10.1093/geroni/igz038.660

Vollestad, J., Sivertsen, B., & Nielsen, G. H. (2011). Mindfulness-based stress reduction for patients with anxiety disorders: evaluation in a randomised controlled trial. *Behav Res Ther, 49*(4), 281-288. Doi:10.1016/j.brat.2011.01.007

Wahbeh, H., Goodrich, E., & Oken, B. S. (2016). Internet-based Mindfulness Meditation for Cognition and Mood in Older Adults: A Pilot Study. *Alternative therapies in health and medicine, 22*(2), 44.

Wang, F. L., Tang, Q. Y., Zhang, L. L., Yang, J. J., Li, Y., Peng, H., & Wang, S. H. (2020). Effects of Mindfulness-based Interventions on Dementia Patients: A Meta-analysis. *Western Journal of Nursing Research, 42*(12), 019394592091675-019394592091173. Doi:10.1177/0193945920916750

Wells, R. E., Kerr, C. E., Wolkin, J., Dossett, M., Davis, R. B., Walsh, J., . . . Yeh, G. (2013). Meditation for Adults with Mild Cognitive Impairment: A Pilot Randomised Trial. *Journal of the American Geriatrics Society, 61*(4), 642-645. Doi:10.1111/jgs.12179

Wetherell, J. L., Hershey, T., Hickman, S., Tate, S. R., Dixon, D., Bower, E. S., & Lenze, E. J. (2017). Mindfulness-Based Stress Reduction for Older Adults With Stress Disorders and Neurocognitive Difficulties: A Randomised Controlled Trial. *The journal of clinical psychiatry, 78*(7), e734-e743. Doi:10.4088/JCP.16m10947

Wettstein, M., Seidl, U., Wahl, H.-W., Shoval, N., & Heinik, J. (2014). Behavioral Competence and Emotional Well-Being of Older Adults with Mild Cognitive Impairment: Comparison with Cognitively

Healthy Controls and Individuals with Early-Stage Dementia. *GeroPsych, 27*(2), 55-65.

Wolfson, N. E., Cavanagh, T. M., & Kraiger, K. (2014). Older Adults and Technology-Based Instruction: Optimizing Learning Outcomes and Transfer. *Academy of Management Learning & Education, 13*(1), 26-44. Doi:10.5465/amle.2012.0056

Zuniga, K. E., Mackenzie, M. J., Kramer, A., & McAuley, E. (2016). Subjective memory impairment and well-being in community-dwelling older adults. *Psychogeriatrics, 16*(1), 20-26. Doi:10.1111/psyg.12112

Chapter 5 – Occupational therapist-led Mindfulness Training Program for Older Adults Living with early Cognitive Decline in Primary Care: A Pilot Randomized Controlled Trial

Citation: Tran, T., Nalder, E., Trothen, T., Finlayson, M., Donnelly, C. (2023). Occupational therapist-led mindfulness training program for older adults living with early cognitive decline in primary care: A pilot randomized controlled trial. (Status: Accepted in the Journal of Alzheimer's Disease Reports)

Abstract

Background: Community-dwelling older adults with early cognitive deficits experience less efficiency in performing everyday life tasks, resulting in decreased satisfaction and other adverse psychological outcomes. Mindfulness training has been linked to cognitive and psychological improvements and, most recently, has been identified as a potential intervention supporting performance of everyday life activities.

Objective: This study aimed to evaluate whether mindfulness practice can improve perceived performance and satisfaction with everyday life activity and secondary psychological outcomes, in older adults with early cognitive deficits in a primary care setting.

Methods: This study is a pilot randomized control trial in an interprofessional primary care team practice in Toronto, Ontario, Canada. The participants were 27 older adults age 60 years of age or older living with early cognitive deficits. Participants were randomized into an 8-Week mindfulness training program (n = 14) group or a Wait-List Control (WLC; n = 13) group compared at baseline, post-intervention and 4-weeks follow-up. MANOVAs with post-hoc independent t-tests were used to compare between groups at different time points.

Results: There was a significant improvement in anxiety, as measured using the Geriatric Anxiety Inventory, for the intervention group compared to the WLC group at post-intervention; Time-2 (mean difference = 3.90; CI = 0.04-7.75; p = 0.04) with large effect size (d = 0.80). No significant differences were found between the two groups in perceived performance or satisfaction with performance of everyday life activities or for other psychological outcomes.

Conclusion: MBSR significantly improved anxiety scores for patients with early cognitive deficits post-intervention. Further work is required to test the sustainability of reduced anxiety over time, but this study demonstrated that MBSR is a promising primary care intervention for

those living with early cognitive deficits. This study warrants the pursuit of a future study in exploring how long the reduced anxiety effects would be sustained. Secondly, whether sustained reduction in anxiety would support improvements in performance of everyday life activities among older adults living with cognitive decline in an interprofessional primary care setting.

Trial registration: This study was reviewed and approved by the Research Ethics Board in Toronto, Ontario, Canada (REB# 2017-0056-E); Queen's University (REB# 6026418) in Kingston, Ontario, Canada, and Clinicaltrials.gov (08/03/2019; NCT03867474).

Background:

The prevalence of memory complaints increases with age (Petersen, 2011; Silva et al., 2014) as approximately a third of community-dwelling older adults will report some degree of memory complaints (Reid & MacLullich, 2006; Zuniga et al., 2016). The earliest form of memory complaint is subjective cognitive decline (SCD), a report of self-experienced persistent decline in cognitive capacity, compared with a previously cognitive status and normal performance on standardized cognitive tests used to classify MCI, adjusted for age, sex and education (Jessen et al., 2020). Next on the spectrum is mild cognitive impairment (MCI), which is described as clinically significant impairment with, (i) increasing forgetfulness raised by the individual or informant, or observed by a clinician; (ii) preservation of basic ADL (e.g., bathing, dressing, toileting); (iii) impairment in one of the cognitive domains encompassing learning memory, language, visuospatial ability, executive function, and psychomotor skills; whereas dementia affects two or more of the cognitive domains (American Psychiatric & American Psychiatric Association, 2013; Petersen et al., 2014). It is estimated that within five to six years of follow-up, approximately 50-80% of patients with MCI will convert to Alzheimer's disease or a related form of dementia (ADRD) (Schmidtke & Hermeneit, 2008; Shigemizu et al., 2020).

Currently, 419,000 Canadians aged 65 and older are living with dementia, and 78,600 new cases are diagnosed every year (Canada, June 2019). With a rapidly aging population in Canada, the total health care costs and out-of-pocket costs for Canadians with dementia care are projected to be $16.6 billion by 2031 (Canada, June 2019). Early cognitive decline such as SCD or MCI has been suggested to be a first possible symptomatic sign of prodromal ADRD (Slot et al., 2019). Exploring interventions to potentially delay, prevent or mitigate the risk of dementia is critical.

Older adults living with cognitive deficits such as SCD or MCI can perform functional activities, such as basic activities of daily living (ADL) (Luck et al., 2012). However, some individuals may perform complex everyday activities with less efficiency (Belchior et al., 2015; Hughes et al., 2012; Johansson et al., 2015; Tomaszewsky et al., 2018), for example, managing finances, handling medications and using everyday technology such as internet/phone banking, may contribute to increased anxiety and depression (Joosten-Weyn Banningh et al., 2008; Reid & MacLullich, 2006; Wettstein et al., 2014; Tomas). The decreased efficiency with everyday tasks has been shown to induce stress, adversely affecting a person's emotional health, well-being, and quality of life (QoL) compared to same age-matched control participants without cognitive deficits (Joosten-Weyn Banningh et al., 2008). Studies have reported that the use of adaptive coping strategies to prevent or alleviate psychological symptoms such as anxiety may also prevent or delay further cognitive decline in this population (Li & Li, 2018; Regan & Varanelli, 2013).

To date, there is emerging evidence of pharmacological interventions that are able to counteract not only depressive symptoms, but also cognitive and functional outcomes for those individuals living with SCD or MCI (Perini et al., 2019). However, pharmacological interventions may also have side-effects (Andreescu & Varon, 2015), drug-drug interaction (Kok & Reynolds, 2017), and increased risk of falls related to polypharmacy (Dhalwani et al., 2017). Consequently, identifying alternative non-pharmacological interventions on its own or in parallel with another pharmacological intervention to support cognition, functional performance or improve QoL for those living with SCD or MCI is critical. Psychological support, such as Mindfulness-Based Stress Reduction (MBSR), is one nonpharmacological intervention gaining increased attention for its potential to improve psychological functioning and potentially self-perceived performance of everyday life activities (Gu et al., 2015; Khoury, Sharma, Rush, & Fournier, 2015).

Emerging research on older adults with SCD or MCI posits that mindfulness training, such as MBSR, may remediate cognitive difficulties (Lenze et al., 2014) and improve executive function (Im et al., 2021). Mindfulness training has been noted to have a dual mechanism of action that improves cognitive functioning. First, mindfulness has been shown to enhance physiological changes in the brain that include amygdala morphology with reduction in perceived stress; improvements in the domain of executive function; increased cortical thickness in regions associated with sensory, cognitive and emotional processing that may provide a reserve against age-related cognitive decline (Gard et al., 2014; Hölzel et al., 2011; Lazar et al., 2005; Whitfield et al., 2021). Second, mindfulness improves psychological symptoms of anxiety, depressive mood, and promotes an overall sense of well-being and QoL, which has favourable effects of mitigating the exacerbating impact of cognitive decline (Helmes & Ward, 2017; Mallya & Fiocco, 2016; Smoski et al., 2016; Williams, 2010). There is evidence that mindfulness training positively impacts performance of activities-of-daily living (ADL) among older adults with neurodegenerative conditions, including MCI and Parkinson's disease, who were recruited from memory clinics, primary care clinics and community settings (Advocat et al., 2016; Wong et al., 2017).

Primary care is often the first point of contact when issues related to memory arise. It is increasingly recognized that an interprofessional team approach can better meet the evolving needs of persons with cognitive deficits in primary care than physician-only care (Hum et al., 2014; Rabin et al., 2015). As members of a primary care team, occupational therapists are well-positioned to address both the functional and psychological needs of older adults with reports of memory impairment (Belchior et al., 2015; Donnelly et al., 2022).

Existing literature has already demonstrated the feasibility and usefulness of mindfulness-based interventions (MBIs) for many conditions in primary care, including psychological distress (McCay et al., 2016), depression (Lopez-Montoyo et al., 2019), overweight and obesity (Salvo et al., 2018), chronic disease (Snapp et al., 2014), mental health conditions (Ortiz et al., 2019), chronic pain (Baker, 2016), and chronic disease self-management behaviours (Kearney, 2020). A meta-analysis by Demarzo et al. (2015) concluded that mindfulness-based interventions, such as MBSR, are promising interventions to enhance mental health, well-being and quality of life among general primary care patients.

Within the past ten years, there is emerging research exploring the effectiveness of MBSR among older adults with SCD or MCI on reducing brain age, and improving cognitive functions (Farhang et al., 2019; Kurth et al., 2021). Furthermore, small proof-of-concept and pilot studies as MBSR have demonstrated the intervention to be feasible, well accepted, and to improve memory self-efficacy and increase brain volume among older adults with SCD and MCI (Smart et al., 2016; Wells et al., 2013).

To the authors' knowledge, there is limited research on SCD and MCI in primary care, specifically focusing on interprofessional team-based environments involving occupational therapy. Furthermore, many of the MBSR studies do not examine functional performance of everyday activities as a primary outcome. Therefore, this study will further build on these small proof-of-concept and pilot studies by adding an interprofessional perspective. As such, the aim of this study was to explore the impact of an occupational therapy-led MBSR on the perceived performance and satisfaction of everyday life activities and psychological outcomes among older adults with SCD or MCI in an interprofessional primary care setting.

The Buddhist Psychological Model (BPM) proposed by Grabovac et al. (2011) will be used as a framework that describes the underlying mechanisms of mindfulness and the changes in cognitive processes that occur with mindfulness training. However, the BPM is insufficient on its own as it lacks the functional implications of everyday activities. As such, the BPM conceptual framework (2011) will be broadened to include a functional lens, informed by the Canadian Model of Occupational Performance and Engagement (CMOP-E) (Townsend et al., 2013). An integrated BPM and CMOP-E framework will guide this study's aim.

Methods

Study design

A single-blinded, pilot randomized controlled trial (RCT) with two parallel groups was used to evaluate primary and secondary clinical outcomes. Following the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) reporting (Chan et al., 2013) (See

Figure 5.1) was followed, and a detailed description of the study protocol has been published elsewhere (Tran, Donnelly, Nalder, Trothen, & Finlayson, 2020).

Study setting

The study took place between April and November 2019 at an interprofessional primary care clinic in Ontario, Canada. Approximately 25% of Ontarians receive their primary care from an interprofessional primary care team. These teams tend to focus on chronic disease management, disease prevention and health promotion (Health Quality Ontario, 2012). The interprofessional team practice, in which the study was implemented, had 18,000 rostered patients living in an urban area, 36 physicians, two dieticians, one occupational therapist, one physiotherapist, two social workers, and one pharmacist. The primary care team provides diagnosis and treatment, internal referrals to other team members or external health care specialists, and after-hours urgent care services.

Participants

Participants were recruited through posters in the clinic waiting and examination rooms and flyers to potential participants from the primary care team, with the following inclusion criteria:

(1) Age ≥ 60 years;

(2) English fluency;

(3) Living independently in the community;

(4) Chart documented self-reported SCD or an MCI diagnosis; and

(5) Rostered with the primary care team,

and exclusion criteria:

(1) History of any prior participation in an MBSR or another mindfulness-based intervention in the past or current mindfulness or yoga practice ≥ 1.5 hrs per week;

(2) History of significant medical (e.g., cancer), neurological (e.g., brain injury) or psychiatric condition (e.g., depression with ≥ 6 on the GDS, active psychosis), or bereavement that significantly impacts mood;

(3) Substance use disorder;

(4) MoCA score ≤ 20;

(5) Current participation in a community-based cognitive or memory training program or involved in another research study; or

(6) Communication barriers (i.e., hearing impairment).

Recruitment

All interested participants were instructed to contact the Principal Investigator (PI), who in turn explained the purpose of the study, the study activities, and the randomization procedures into either an 8-Week MBSR program or a wait-list control (WLC) group. All interested participants were screened for eligibility by telephone, and if deemed appropriate, were scheduled for a face-to-face appointment. The Montreal Cognitive Assessment (MoCA) and Geriatric Depression Scale (GDS) were administered to screen for inclusion eligibility. Any participant with scores ≤ 19 on the MoCA or > 10 on the GDS were referred to their family physician for further assessment and were excluded from the study. Written consent was obtained from all interested participants who met the eligibility criteria.

Randomization

Study participants were randomized to either the 8-Week, MBSR program (not including orientation and one all-day silent retreat) or the 8-Week WLC group. Participants were randomized by a block size of four. Two participants were allocated into the MBSR group and two others in the WLC group, resulting in six different possible block combinations. The randomization design and sequence were carried out by an independent staff member not involved in the trial. Opaque envelopes were sealed to ensure allocation concealment. The study included 27 participants (MBSR n = 14; WLC; n = 13) based on our recruitment period between April and August, with an expected start date to run the MBSR group after three and a half months of recruitment. The WLC group received the MBSR program three months after the intervention group trial was completed.

Blinding

All research staff, including the PI, were blinded to the randomization list until the intervention and all data collection were completed. To reduce the risk of unblinding, a research assistant (RA) provided all reminder phone calls for the participants' assessment dates and instructed them not to disclose which group they were in before their assessment. The qualified-MBSR teachers delivering the intervention were not blinded.

Sample size

As this was a feasibility study, the sample size was not formally calculated. Our goal was to recruit 30 plus participants accounting for a 20% attrition rate based on other feasibility studies (Aguirre et al., 2017; Billingham, Whitehead, & Julious, 2013). In the three-and-a-half-month recruitment period, we were able to recruit 27 participants.

Intervention procedures

The intervention was an 8-Week MBSR program established in 1979 by Kabat-Zinn (Kabat-Zinn & University of Massachusetts Medical Center/Worcester. Stress Reduction, 2009) and followed the Mindfulness-Based interventions (MBIs) Teaching Assessment Criteria to ensure teaching integrity. Each of the nine sessions, including orientation, were three-hours in duration; a tenth session consisted of an all-day retreat of mindfulness practice (e.g., lying down body scan; sitting meditation; mindful eating; mindful movements, such as walking and light hatha yoga) and an inquiry about the practice. The all-day silent meditation retreat took place during week seven as a regular weekly session consisting of six and a half hours, rather than on a customary weekend based on the MBSR protocol. Thus, this extended the MBSR program an extra week from a standard 8-weeks to 9-week, as to make it consistent for ease of participants' routine such as timing, location and travel plans. However, there was no change made to the 30.5 hrs of classroom time based on the MBSR curriculum and participants were expected to complete a guided mindfulness practice at home for 30-45 minutes per day; six times a week throughout the intervention. Participants were encouraged to continue with the home practice for another four weeks after completing the MBSR group and to come back for follow-up at 13-week.

Computer tablets (i.e., mini-iPads) were used to deliver the home training program and collect data on home training. Two primary qualified-MBSR teachers delivered the MBSR program, and two other secondary qualified-MBSR teachers, one of which was the PI, also supported the delivery but focused more on answering questions around technology, helping participants with positioning in mindful movement and assisted other administrative duties such as setting up the room. The two additional MBSR teachers supported participants with tablet use guidance before or after each session. Only participants who had access to Wi-Fi were given a computer tablet (i.e., mini-iPads) to use the Application (App), and the Insight Timer (Timer, 2019). The App was used for home practice, and it also logged participants' frequency and duration of mindfulness practice. Participants who did not have access to Wi-Fi were given compact discs, and they logged their home practice using pen and paper.

To track delivery and receipt fidelity, the PI: (i) monitored the MBSR curriculum to ensure the intervention was carried out per protocol by Qualified MBSR teachers; (ii) collected participant attendance records and home practice diaries; (iii) noted observational data of participants performing the mindfulness practices and level of engagement with inquiry and reflection during each session, (iv.) ensured participants who missed a session were followed-up by an RA with a phone call to provide the assigned home practice for the week; and last, (v.) addressed any technological issues that arose.

Ethical considerations

This study was reviewed and approved by Research Ethics Board at Women's College Hospital (REB# 2017-0056-E); and Queen's University (REB# 6026418) Kingston, Ontario, Canada.

Measurement and Timeline

The primary clinical outcome was the Canadian Occupational Performance Measure (COPM). This individualized, client-centred outcome measure aims to identify and assess an individual's self-perceived difficulty in the performance of everyday activities and satisfaction with their performance (Law & Canadian Association of Occupational, 2005). A maximum of five everyday activities that are difficult can be identified, and each is rated on a 10-point scale. The COPM measures change in functional performance and satisfaction in these activities over time. The COPM has two main scores for each of the performance and satisfaction rating, consisting of an average score calculated by summing individual problem scores and dividing by the number of problems. The second score is a change score calculated after a reassessment interval and then compared and evaluated for change (Catherine Donnelly & Carswell, 2002).

The COPM has a strong test-retest reliability (ICC=0.63 for performance and 0.84 for satisfaction) (Carswell et al., 2004), with good responsiveness (Catherine Donnelly & Carswell, 2002). Furthermore, the COPM has been identified as a valuable tool to guide assessments as it focuses on function rather than medical symptoms and is ideal for clinicians to offer comprehensive client-centred services in an interprofessional primary care setting (Catherine Donnelly, O'Neill, Bauer, & Letts, 2017).

Secondary psychological clinical outcome measures included the Patient Health Questionnaire (PHQ-9), which has excellent internal reliability with a Cronbach's of 0.89 in a PHQ-9 Primary Care Study, and excellent test-retest reliability (Phelan et al., 2010). The Geriatric Anxiety Inventory (GAI) has high inter-rater (r=0.89) and test-retest (r=0.86) reliability (Pachana et al., 2007) and similarly, the Perceived Stress Scale (PSS) which has acceptable psychometric properties with satisfactory test-retest reliability criterion assessed at >0.70 (E.-H. Lee, 2012). The Cognitive and Affective Mindfulness Scale-Revised (CAMS-R) demonstrated internal consistency reliability with Cronbach's alpha ranges from 0.61 to 0.81 (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). In addition, the QoL-Alzheimer's disease (QoL-AD) measure demonstrated good test-retest reliability and strong inter-rater reliability with Cohen's kappa values >0.70 (Logsdon, 1999). Lastly, the Acceptance and Action Questionnaire (AAQ-II) has an alpha coefficient of 0.84 and demonstrated good test-retest reliability at 3-months at 0.81 and 12 months at 0.89 (Bond et al., 2011).

Assessments were conducted at three different time points: baseline (Time-1) at week 0, post-MBSR intervention (Time-2) at Week-9, and 1-month post-MBSR follow-up (Time-3) at

Week-13. See **Table 5.1** – Timeline. The PI conducted all assessments for both intervention and WLC participants at Time-1 (Week-0). A blinded independent assessor completed the post-intervention assessments at Time-2 (Week-9), and Time-3 (Week-12). All WLC group participants were assessed at the same intervals as the MBSR group.

Table 5.1

Time Frame of Measurements for Participants

Measures Taken	**(Time 1)**	**(Time 2)**	**(Time 3)**
Item	0-week	9-week (Post-MBSR)	13-week (Follow-Up)
Screening			
(MoCA and GDS)	X		
Primary Outcome			
COPM	X	X	X
Secondary Outcomes			
GAI	X	X	X
AAQ-II	X	X	X
PHQ-9	X	X	X
QoL-AD	X	X	X
PSS	X	X	X
CAMS-R	X	X	X

Montreal Cognitive Assessment (MoCA); Geriatric Depression Scale (GDS); Canadian Occupational Performance Measure (COPM); Geriatric Anxiety Inventory (GAI); Acceptance and Action Questionnaire (AAQ-II); Patient Health Questionnaire-9 (PHQ-9); Quality-of-Life-Alzheimer's disease (QoL-AD); Cognitive and Affective Mindfulness Scale-Revised (CAMS-R).

Data analysis

Baseline differences between the two groups, including primary and secondary outcomes, were compared using two-sample t-tests or x^2 tests or Fischer's exact test for categorical variables. Missing data were managed using the "last observation carried forward" method, whereby the last measurement, which was taken before a participant withdrew from the study, is retained and used for data analysis (Wong, Boscardin, Postlethwaite, & Furst, 2011).

To evaluate the impact of MBSR on the primary and secondary clinical outcomes, a multivariate analysis of variance (MANOVA) was conducted to compare the two groups (i.e., the MBSR and WLC groups), at Time-1 to Time-2, Time-2 to Time-3 and Time-1 to Time-3. Results for each measure were reported as between-group means, standard deviation (SD), average and change scores (for COPM only) and lastly, based on a MANOVA model, treatment effects and effect sizes in partial eta squared (n_p^2). A 95% confidence interval (CI) and alpha of 0.05 were reported for statistical significance levels. A MANOVA was used as an ANOVA would have violated this study's assumption of the independence of the residual. Last, MANOVA uses an omnibus test (i.e., global test of time) and if significant, will be followed up by a t-test as per this study.

To investigate significant differences between the WLC and MBSR groups, post-hoc analysis using a pairwise comparison between three different time points, with a Bonferroni adjustment, was undertaken. We used an independent t-test for post-hoc analysis to investigate significant differences between the WLC and MBSR groups at three different time points, and the effect size is reported in Cohen's *d*. To determine a sample size calculation in a future larger clinical trial, the following factors would need to be considered (i) assuming a mean difference between WLC and MBSR groups at follow-up time (13-weeks) – for example, the primary clinical outcome is the COPM *performance* (e.g., $M_{(control)} = 6.21$, $M_{(MBSR)} = 6.94$ at Time-3) estimating the mean difference would be 0.73, and (ii) a pooled standard deviation $SD_{(control)} = 1.70$, $SD_{(MBSR)} = 1.85$ at Time-3. Based on these factors, a sample size of 188 (total), MBSR (*n*=94) and WLC (*n*=94), would provide 80% power to detect the aforementioned mean difference at a 5% alpha level for a larger clinical trial.

Results

Participant demographics

From April to August 2019 (4.5 months), 53 participants were recruited, of which 17 were excluded at initial screening (nine were not patients of the primary care team; two had scheduling conflicts; four declined; one was below age cut-off; one had a hearing impairment). The remaining 36 participants completed a face-to-face screening where a further nine participants were deemed ineligible (three had low MoCA score; three had high GDS score; one was unable to attend the timing of the intervention; one had taken MBSR before; one was participating in another study). A total of 27 participants provided written consent and were randomized to the WLC (n = 13) or MBSR (n = 14) group. The overall drop-out rate in the study was 14.8%, with one WLC (one participant declined to participate after giving consent) and three MBSR groups (one moved to assisted living; one had a conflict with work; one declined to participate). As a result, we ended with WLC (n = 12) and MBSR (n = 11). The SPIRIT flow chart provides the outline of the study in **Figure 5.1**. No adverse events occurred during the duration of the study.

No differences were found between the participants in the MBSR and the WLC group, with the exception that more participants in the intervention group had a driver's license. In addition, though not statistically significant, there was 1 male in the WLC group compared to 6 males in the MBSR group. See **Table 5.2** for participants' demographics.

Figure 5.1:
SPIRIT Flow Chart

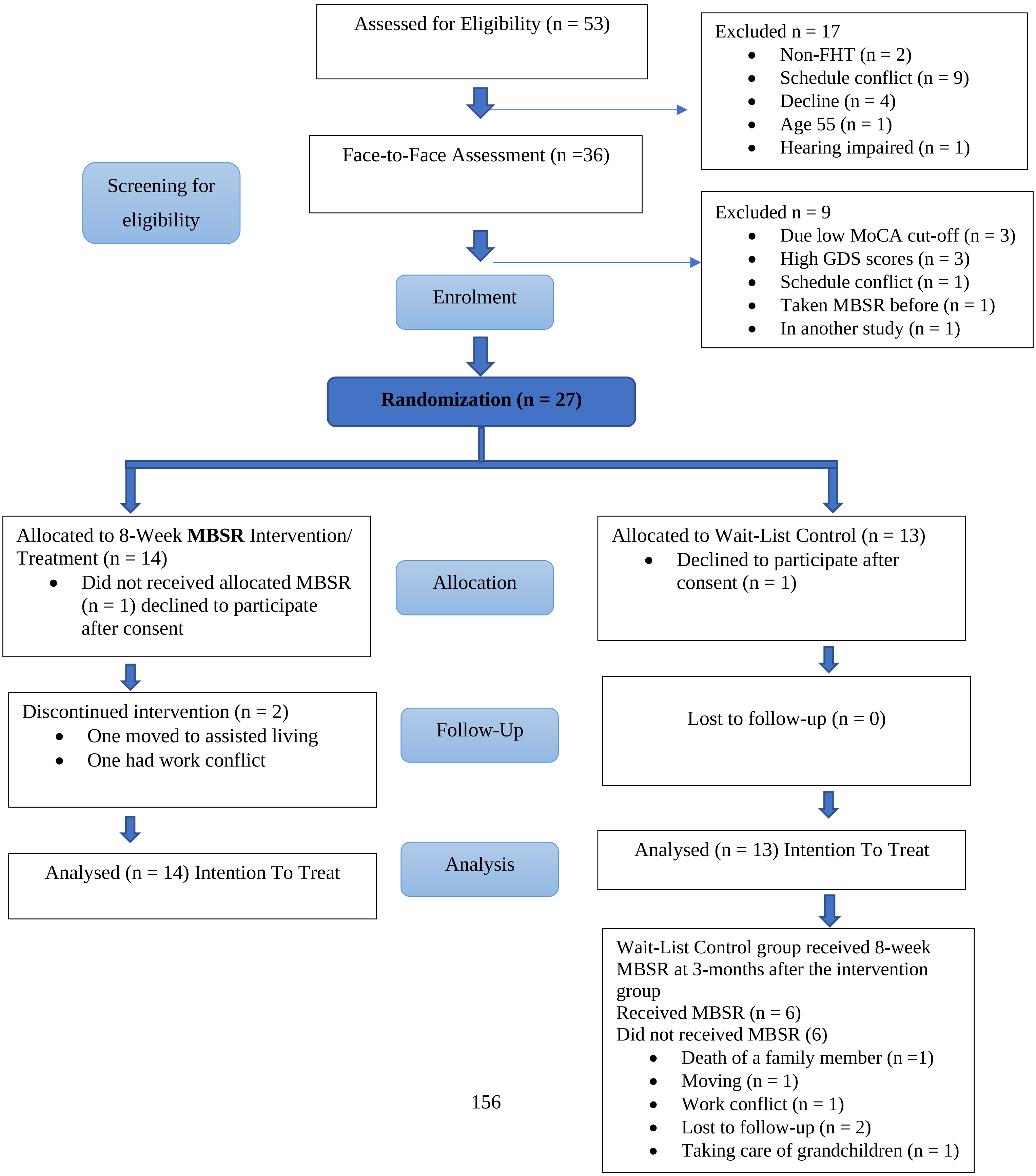


Table 5.2: Demographics and characteristics of participants (n = 27)

Characteristics	Total (No., % total) MBSR n = 14	Control n = 13	Significance
Age (Mean; SD), years	71.43 (9.0)	75.31 (9.5)	
Range	60-83	62-92	0.28
Sex: Female	8 (57.1%)	12 (92.3%)	0.07
Education Level			
None	2 (14.3%)	1 (7.7%)	
High School	3 (21.4%)	2 (15.4%)	
College	0 (0%)	3 (23.1%)	
University	9 (64.3%)	7 (53.8%)	0.38
Living Arrangement			
Alone	4 (28.6%)	8 (61.5%)	
With partner	6 (42.9%)	2 (15.4%	
With family/friends	4 w/ (28.6%)	3 (23.1%)	0.20
Marital Status			
Married	11 (78.6%)	11 (84.6%)	
Common-law	1 (7.1%)	2 (15.4%)	
Other	2 (14.2%)	0	0.38
Currently Employed			
Yes	6 (42.9%)	3 (23.1)	0.42
Household Income			
< $50K	8 (57%)	6 (57%)	
$51-99K	2 (14.2%)	5 (38.5%)	
> $100K	4 (28.6%)	2 (15.4%)	0.54
Have Driver's License			
Yes	11 (78.6%)	5 (38.5%)	**0.03***
Currently Driving			
No	7 (50%)	9 (69.2%)	0.31
Previous Head Injury			
Yes	5 (35.7%)	5 (38.5%)	1.00
Physical Activity			
Yes	11 (78.6%)	12 (92.3%)	
No	3 (21.4%)	1 (7.7%)	0.59
Duration of Physical Activity (Mean; SD) hrs	3.83 (3.21)	6.76 (4.60)	0.06
Meditation Practice (≤ 1.5 hrs)	3 (21.4%)	2 (15.4%)	1.00
Montreal Cognitive Assessment (MoCA)	25.00 (2.45)	25.92 (2.29)	0.33
MCI Diagnosis			
Yes	2 (14.3%)	2 (15.4%)	0.67
Geriatric Depression Scale (GDS)	2.14 (2.68)	2.92 (2.49)	0.44

*significant at p (< 0.05).

Primary clinical outcome

COPM – Performance (average and change scores)

Table 5.3 shows the *COPM performance* average and change scores, a significant *main effect for time* was found for both the intervention and WLC groups, with higher average and change scores post-intervention ($p < 0.05$; $n_p^2 = 0.21$). There was no significant *interaction effect* with group and time and no *main effect* comparing MBSR and WLC between the two groups on the *COPM performance* average and change scores. There was also no statistical significance between groups at any of the three different time points.

COPM – Satisfaction (average and change scores)

There was no significant *interaction effect* with group and time, no *main effect for time* and no *main effect* between the MBSR and WLC on the *COPM satisfaction* average or change scores. When an independent t-test between groups at different time points was undertaken, no statistical significance was found at any of the three different time points.

Secondary clinical outcomes

Table 5.3 shows the mean scores and standard deviations for each of the secondary clinical outcomes at Time-1 (baseline), Time-2 (9-weeks; post-intervention) and Time-3 (13-weeks; follow-up). Effect sizes were reported between groups at three different time points. At post-intervention at Time-2, there was a significant main effect for the GAI (mean difference = 3.90; *CI* = 0.04-7.75; $p = 0.04$) with a large effect size ($d = 0.80$). Otherwise, there were no statistically significant changes at three different time points between groups for the remainder of the secondary clinical outcomes. However, on the *PHQ-9*, a significant *main effect for time* ($p < 0.03$; $n_p^2 = 0.25$) and a significant *interaction effect* with group and time ($p < 0.02$; $n_p^2 = 0.26$) with large effect size was found. Additionally, *a* significant *interaction effect* with group and time was found on the *QoL-AD* measure with a large effect size ($p < 0.03$; $n_p^2 = 0.25$). Lastly, we found a significant *main effect for time* with a large effect size ($p < 0.01$; $n_p^2 = 0.31$) on the *PSS.*

Lastly, when we performed an independent t-test between groups at different time points, We found a significant reduction in anxiety levels at post-intervention compared to the WLC group. See **Table 5.4**

Table 5.3 – *Mean and Standard Deviation (All Data)*

	Control (n = 13)						MBSR (n = 14)								
	Time-1		Time-2		Time-3		Time-1		Time-2		Time-3		Group x time	Time effect	Group effect
Outcome Measures	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***p* value (ES - $\eta_p{}^{2**}$)**		
Canadian Occupational Performance Measure (COPM)															
(Performance Average Scores)	5.56	0.90	5.97	1.82	6.21	1.70	6.30	1.58	7.14	1.32	6.94	1.85	0.71 (0.02)	**0.05***(0.21)	0.08 (0.11)
(Performance Change Scores)			0.40	1.71	0.64	1.51			0.84	1.23	0.63	1.51	0.48 (0.02)	0.96 (0.00)	0.65 (0.00)
Canadian Occupational Satisfaction Measure (COPM)															
(Satisfaction Average Scores)	5.28	1.51	5.29	2.35	5.55	2.06	5.53	1.80	6.57	1.95	7.11	2.13	0.24 (0.11)	0.11 (0.16)	0.12 (0.09)
(Satisfaction Change Scores)			0.01	1.76	0.28	1.93			1.04	1.48	1.58	2.40	0.69 (0.00)	0.23 (0.05)	0.69 (0.11)
Geriatric Anxiety Inventory (GAI)	7.38	7.00	6.62	4.94	4.77	4.34	5.93	7.28	2.71	4.76	2.64	4.88	0.07 (0.19)	**0.01***(0.33)	0.21 (0.06)
Acceptance and Action Questionnaire (AAQ-II)	17.46	9.70	17.23	8.44	16.85	8.15	20.00	8.44	15.93	4.56	15.07	6.15	0.28 (0.10)	0.13 (0.16)	0.95 (0.00)
Patient Health Questionnaire (PHQ-9)	6.00	5.21	6.23	4.25	3.85	5.73	6.93	5.08	4.29	2.76	4.57	3.18	**0.02***(0.26)	**0.03***(0.25)	0.95 (0.00)
Quality-of-Life Alzheimer's disease (QoL-AD)	38.69	7.00	37.62	8.47	38.77	6.89	34.36	5.30	37.29	3.76	36.79	4.63	**0.03***(0.25)	0.17 (0.14)	0.33 (0.04)
Perceived Stress Scale (PSS)	16.85	8.11	15.46	7.84	13.38	7.57	18.86	7.48	12.86	4.33	12.50	4.93	0.26 (0.11)	**0.01***(0.31)	0.82 (0.00)
Cognitive Affective Mindfulness Scale Revised (CAMS-R)	29.31	5.87	29.38	6.79	28.54	6.35	27.14	6.20	29.71	4.97	31.36	4.31	0.08 (0.19)	0.30 (0.10)	0.87 (0.00)

Time-1 = baseline; Time-2 = post-MBSR intervention; Time-3 = 4-weeks follow-up; *significant at *p* (<0.05); (**Effect size described as partial eta squared).

Table 5.4 – Independent t-test between groups at different time points

	Control (N = 13)		MBSR (N = 14)			*Mean*		
	M	SD	M	SD	*p<0.05*	*difference*	*95% CI*	*d*
COPM – Performance (Average scores)								
Time-1	5.56	0.90	6.30	1.58	0.14	-0.73	-1.76-0.28	-0.56
Time-2	5.97	1.82	7.14	1.32	0.07	-1.17	-2.45-0.10	-0.74
Time-3	6.21	1.70	6.94	1.85	0.29	-0.72	-2.13-0.67	-0.41
COPM – Performance (*Change scores*)								
Time-2	0.40	1.71	0.84	1.23	0.24.	-0.44	-1.62-0.73	-0.30
Time-3	0.64	1.51	0.63	1.51	0.62	0.00	-1.22-1.22	0.00
COPM – Satisfaction (Average scores)								
Time-1	5.28	1.51	5.53	1.80	0.70	-0.25	-1.56-1.06	-0.14
Time-2	5.29	2.35	6.57	1.95	0.14	-1.27	-3.00-0.44	-0.59
Time-3	5.55	2.06	7.11	2.13	0.06	-1.55	-3.21-0.11	-0.74
COPM – Satisfaction (*Change scores*)								
Time-2	0.01	1.76	1.04	1.48	0.38	-1.03	-2.32-0.25	-0.63
Time-3	0.28	1.93	1.58	2.40	0.57	-1.30	-3.03-0.43	-0.59
GAI								
Time-1	7.38	7.00	5.93	7.28	0.60	1.45	-4.21-7.12	0.20
Time-2	6.62	4.94	2.71	4.76	**0.04***	3.90	0.04-7.75	0.80
Time-3	4.77	4.34	2.64	4.88	0.24	2.12	-1.52-5.78	0.44
AAQ								
Time-1	17.46	9.70	20.00	8.44	0.47	-2.53	-9.78-4.70	-0.28
Time-2	17.23	8.44	15.93	4.56	0.62	1.30	-4.23-6.84	0.19
Time-3	16.85	8.15	15.07	6.15	0.53	1.77	-4.01-7.56	0.24
PHQ-9								
Time-1	6.00	5.21	6.93	5.08	0.64	-0.92	-5.00-3.15	-0.18
Time-2	6.23	4.25	4.29	2.76	0.17	1.94	-0.94-4.84	0.54
Time-3	3.85	5.73	4.57	3.18	0.69	-0.72	-4.50-3.05	-0.15
QoL-AD								
Time-1	38.69	7.00	34.36	5.30	0.08	4.33	-0.63-9.30	0.70

Time-2	37.62	8.47	37.29	3.76	0.89	0.33	-5.07-5.73	0.05
Time-3	38.77	6.89	36.79	4.63	0.39	1.98	-2.75-6.72	0.42
PSS								
Time-1	16.85	8.11	18.86	7.48	0.51	-2.01	-8.19-4.16	-0.25
Time-2	15.46	7.84	12.86	4.33	0.30	2.60	-2.56-7.77	0.41
Time-3	13.38	7.57	12.50	4.93	0.72	0.88	-4.27-6.04	0.89
CAMS-R								
Time-1	29.31	5.87	27.14	6.20	0.36	2.16	-2.61-6.94	0.35
Time-2	29.38	6.79	29.71	4.97	0.88	-0.33	-5.10-4.45	-0.05
Time-3	28.54	6.35	31.36	4.31	0.19	0.19	-7.19-1.55	-0.52

*significant at p (<0.05)

Discussion

This study is the first known to evaluate an occupational therapist-led MBSR program for individuals with SCD or MCI in a team-based primary care setting. The study found that older adults who completed the 9-week occupational therapist-led mindfulness training program had decreased anxiety levels at post-intervention compared to those who did not. These findings are consistent with other meditation intervention studies that have found a reduction in anxiety in older adults (Helmes & Ward, 2017; Moore et al., 2016), veterans (Serpa et al., 2014), and also among the general adult population (Vollestad et al., 2011). Studies have suggested that older adults with MCI who experience anxiety have poorer cognitive performance and a greater risk of future cognitive decline (Beaudreau & O'Hara, 2008). A systematic review and meta-analysis conducted by Li et al. (2018) noted that meditation interventions aimed at helping those experiencing the co-occurrence of anxiety and MCI may prevent the progression to dementia (Li & Li, 2018). Occupational therapists have been shown to play an important role in secondary prevention in primary care settings (Donnelly et al., 2016), and MBSR could be considered an intervention to prevent or alleviate further cognitive decline in older adults.

In this study, all qualified-MBSR teachers ensured delivery of fidelity was met by following the MBSR curriculum guide from the University of Massachusetts, Medical School in conjunction with the MBI Teaching Assessment Criteria. On the other hand, receipt fidelity was observed by ensuring all participants' attendance and home practice logs were collected and analyzed. Furthermore, any missed sessions were followed-up with an RA to provide assigned home assignments. Lastly, the only change made to the MBSR curriculum was the all-day retreat was moved to the following week rather than having it on a typical weekend, thereby extending the program an extra week; from 8-weeks to 9-weeks. Otherwise, the total dosage of sessions and hours were the same as per the authorized MBSR curriculum.

The study did not find any significant differences between the intervention and control groups for the COPM, the primary outcome. Instead, participants in both the invention and control groups had gains in self-reported performance and satisfaction with their performance on self-identified activities that were difficult for them. There are a few possible explanations. First, the COPM is an interview-based assessment, requiring individuals to reflect on their daily activities. It could be that simply engaging in the interview may have prompted participants to reflect on their concerns, and this reflection, in turn, may have caused or influenced a therapeutic effect phenomenon. Studies using the COPM have theorized that improvements in a control group could be caused by interviewing participants and engaging them in that therapeutic process at baseline interviews (Tuntland et al., 2015). Additionally, participants had relatively high scores at baseline, which left little room for change in the intervention group.

The COPM is individualized and therefore idiosyncratic in nature, making it difficult to compare across individuals and may be better suited as a clinical outcome than a research measure. It is also important to note that this was a pilot study and, given the small sample, was not powered to detect significant changes. Wong et al. (2017) conducted a study with older adults with MCI recruited from both specialist and primary care clinics and found a positive relationship between mindfulness home practice and an overall improvement in ADL functioning (Wong et al., 2017). However, unlike the current study, they did not have a comparison group, and ADL functioning was measured using the Bayer Activities of Daily Living Scale, a self-reported ADL scale. Advocat et al. (2017) conducted an RCT design comparing a 6-week mindfulness training program to a WLC in adults and older adults with

Parkinson's disease. The authors found a significant improvement in the ADL item scores from the Parkinson's Disease Questionnaire (PDQ) 6-months after the mindfulness training (Advocat et al., 2016). Interestingly, both studies used a self-report measure and focused explicitly on ADL, versus the current study that used an interview-based outcome that included a wide range of everyday occupations of varying complexity, including self-care ADL, leisure, productivity and iADL. Using a more targeted ADL measure may be worthwhile exploring in future studies as the COPM is more idiosyncratic in nature and some goals may be more challenging to address in a limited timeframe than others. Therefore, future trials investigating functional outcomes may consider using more targeted ADL measures in conjunction with an individualized outcome such as the COPM.

This study hypothesized that MBSR would have an impact on participants' perceived satisfaction on their performance of everyday activities and psychological issues for older adults living with SCD and MCI and were surprised to have found no overall significant differences in the study's primary clinical outcomes on the COPM. On the other hand, our findings did support our hypothesis of psychological improvement with a significant reduction in anxiety at Time-2. However, the reduction in anxiety was not maintained on follow-up.

A recent systematic review and meta-analysis by Vibe et al. (2017) found that MBSR improved QoL, and has mental health benefits, such as stress and mindfulness traits among the general and older population compared to a WLC group. The findings in this systematic review contradict our findings (Vibe et al., 2017). One possible explanation for the non-significant improvement in mood that we found in our study could be that participants with high depression scores were excluded from the study and the fact that our study was underpowered. Last, in our study, there was an uneven drop-out rate between the two groups, with more drop-outs in the

MBSR group (n = 3), which may have artificially stabilized the effect sizes of our intervention as we used a conservative LOCF (Molnar et al., 2008). On the other hand, the lower attrition rate in the Control group (n = 1) may benefit from inflation due to the added effect of follow-up (McCarney et al., 2007).

We found a significant improvement in anxiety in the intervention group, suggestive that MBSR could be an effective strategy to support those living with early cognitive deficits. However, long-term effects on anxiety reduction need to be further investigated as effective mindfulness-based stress reduction requires regular and sustained practice. It has been noted that once mindfulness intervention ends, there is often a decline in regular mindfulness practice and the respective gains. Thus, to maintain the benefits of mindfulness practice, the practice must be consistent and ongoing as evidence is suggestive that the extent of formal practice is associated with positive intervention outcomes (Kor et al., 2019; Parsons, Crane, Parsons, Fjorback, & Kuyken, 2017). Given there are currently emerging pharmacological interventions that mitigate the impact of psychological symptoms, including cognitive and functional outcomes among individuals with cognitive impairment however, they come with side effects (Perini et al., 2019; Levine et al., 2021). Mindfulness may be one non-pharmacological way to address psychological symptoms such as anxiety, and future studies may explore the potential reduction in anxiety and the associated protective benefits against cognitive decline (Khalsa, 2015) and the development of MCI and Alzheimer's disease (Larouche et al., 2016).

Primary care health team professionals are usually the first point of contact when older adults and their families have memory concerns. Thus, occupational therapists on primary care teams are well-positioned to support older adults with SCD or MCI. Offering MBSR programs in primary care will provide an additional interprofessional perspective and align well with the health promotion model supporting older adults to age-in-place. Interprofessional primary care teams can better support individuals with complex health conditions compared to physician care alone. Interdisciplinary primary care teams can provide diverse responses to older adults with memory decline, including primary care-based memory clinics (Lee et al., 2014). MBSR program delivery is inexpensive (Paller et al., 2015), other than personal time commitment for the mindfulness practice, and it has been deemed safe with no adverse events and is feasible as indicated in earlier studies (Cheung et al., 2020; Kovach et al., 2018; Smart et al., 2016). Thus, embedding MBSR into a primary care setting to support an ageing population has few negatives and therapeutic potential to reduce anxiety.

Study limitations

This study had a few limitations that must be considered. First, as a pilot RCT study, a small sample was not adequately powered to determine statistical significance. Our results should only be interpreted as promising and warranting a larger clinical trial or assessing minimally clinically 2-point change on the COPM. Second, our sample included predominantly highly educated participants from higher socioeconomic status, and additional research should be conducted with a more diverse sample. Third, follow-up was only 4-weeks, and a longer follow-up may be needed to determine the longer-term effects of mindfulness training (Li & Bressington, 2019) beyond the 4-week follow-up period examined in this study. Fourth, within four and half months of recruitment, we were able to screen 53 eligible participants, of which only 27 were randomized. Future trials may consider a longer recruitment period of greater than four and a half months in such primary care settings to obtain a larger sample size. Furthermore, future studies may consider using an active WLC to rule out if participation in a group may have an effect.

Conclusion

Primary care is usually the first point of contact when community-dwelling older adults and their families experience memory-related concerns. Occupational therapists on primary care teams are well-positioned to support those older adults with SCD or MCI by supporting and maintaining their independence, and by doing so, supporting older adults to age-in-place (Ciro, 2014). Team-based primary care can better support individuals with complex health conditions such as SCD or MCI than physician care alone. This study is the first occupational therapist-led MBSR program for older adults with SCD or MCI and has provided preliminary evidence that mindfulness training improves anxiety compared to a WLC group in an interprofessional primary care setting. This study has laid the groundwork for a potential larger powered clinical trial to explore further the effectiveness of mindfulness training and utilization of various performance-based functional outcomes for older adults with memory complaints.

References

Advocat, J., Enticott, J., Vandenberg, B., Hassed, C., Hester, J., & Russell, G. (2016). The effects of a mindfulness-based lifestyle program for adults with Parkinson's disease: a mixed methods, wait list controlled randomised control study. *BMC neurology, 16*(1), 166-166. doi:10.1186/s12883-016-0685-1

Aguirre, E., Stott, J., Charlesworth, G., Noone, D., Payne, J., Patel, M., & Spector, A. (2017). Mindfulness-Based Cognitive Therapy (MBCT) programme for depression in people with early stages of dementia: study protocol for a randomised controlled feasibility study. *3*. doi:10.1186/s40814-017-0143-x

American Psychiatric, A., & American Psychiatric Association, D. S. M. T. F. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.). Washington, D.C: American Psychiatric Association.

Andreescu, C., & Varon, D. (2015). New Research on Anxiety Disorders in the Elderly and an Update on Evidence-Based Treatments. *Current Psychiatry Reports, 17*(7), 1-7. doi:10.1007/s11920-015-0595-8

Baker, N. M. D. (2016). Using Cognitive Behavior Therapy and Mindfulness Techniques in the Management of Chronic Pain in Primary Care. *Primary care, 43*(2), 203-216. doi:10.1016/j.pop.2016.01.001

Beaudreau, S. A., & O'Hara, R. (2008). Late-Life Anxiety and Cognitive Impairment: A Review. *The American Journal of Geriatric Psychiatry, 16*(10), 790-803. doi:10.1097/JGP.0b013e31817945c3

Belchior, P., Korner-Bitensky, N., Holmes, M., & Robert, A. (2015). Identification and assessment of functional performance in mild cognitive impairment: A survey of occupational therapy practices. *Australian Occupational Therapy Journal, 62*(3), 187-196. doi:10.1111/1440-1630.12201

Billingham, S. A. M., Whitehead, A. L., & Julious, S. A. (2013). An audit of sample sizes for pilot and feasibility trials being undertaken in the United Kingdom registered in the United Kingdom Clinical Research Network database. *BMC medical research methodology, 13*(1), 104-104. doi:10.1186/1471-2288-13-104

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., . . . Zettle, R. D. (2011). Preliminary Psychometric Properties of the Acceptance and Action Questionnaire–II: A Revised Measure of Psychological Inflexibility and Experiential Avoidance. *Behavior Therapy, 42*(4), 676-688. doi:10.1016/j.beth.2011.03.007

Canada, P. H. A. o. (June 2019). *A Dementia Strategy for Canada: Together We Aspire*. Ottawa, Canada

Carswell, A., McColl, M. A., Baptiste, S., Law, M., Polatajko, H., & Pollock, N. (2004). The Canadian Occupational Performance Measure: A Research and Clinical Literature Review. *Canadian Journal of Occupational Therapy, 71*(4), 210-222. doi:10.1177/000841740407100406

Chan, A.-W., Tetzlaff, J. M., Altman, D. G., Laupacis, A., Gøtzsche, P. C., Krleža-Jerić, K., . . . Moher, D. (2013). SPIRIT 2013 Statement: Defining Standard Protocol Items for Clinical Trials. *Annals of internal medicine, 158*(3), 200-207. doi:10.7326/0003-4819-158-3-201302050-00583

Cheung, D. S. K., Kor, P. P. K., Jones, C., Davies, N., Moyle, W., Chien, W. T., . . . Lai, C. (2020). The use of modified Mindfulness-based Stress Reduction and Mindfulness-based Cognitive Therapy programme for family caregivers of people living with dementia: a feasibility study. *Asian Nursing Research, 14*(4), 221-230. doi:10.1016/j.anr.2020.08.009

Ciro, C. A. (2014). Maximizing ADL Performance to Facilitate Aging in Place for People with Dementia. *Nursing Clinics of North America, 49*(2), 157-169. doi:10.1016/j.cnur.2014.02.004

Dhalwani, N. N., Fahami, R., Sathanapally, H., Seidu, S., Davies, M. J., & Khunti, K. (2017). Association between polypharmacy and falls in older adults: a longitudinal study from England. *BMJ Open, 7*(10), e016358. doi:10.1136/bmjopen-2017-016358

Donnelly, C., & Carswell, A. (2002). Individualized Outcome Measures: A Review of the Literature. *Canadian Journal of Occupational Therapy, 69*(2), 84-94. doi:10.1177/000841740206900204

Donnelly, C., Leclair, L. L., Hand, C., Wener, P. F., & Letts, L. J. (2022). *Occupational therapy and primary care: a vision for the path forward*.

Donnelly, C., O'Neill, C., Bauer, M., & Letts, L. (2017). Canadian Occupational Performance Measure (COPM) in Primary Care: A Profile of Practice. *The American journal of occupational therapy : official publication of the American Occupational Therapy Association, 71*(6), 7106265010p7106265011. doi:10.5014/ajot.2017.020008

Donnelly, C. A., Leclair, L. L., Wener, P. F., Hand, C. L., & Letts, L. J. (2016). Occupational therapy in primary care: Results from a national survey: L'ergothérapie dans les soins primaires : Résultats d'un sondage national. *The Canadian Journal of Occupational Therapy, 83*(3), 135. doi:10.1177/0008417416637186

Farhang, M., Miranda-Castillo, C., Rubio, M., & Furtado, G. (2019). Impact of mind-body interventions in older adults with mild cognitive impairment: a systematic review. *Int Psychogeriatr, 31*(5), 643-666. doi:10.1017/S1041610218002302

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J.-P. (2007). Mindfulness and Emotion Regulation: The Development and Initial Validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment, 29*(3), 177-190. doi:10.1007/s10862-006-9035-8

Gard, T., Hölzel, B. K., & Lazar, S. W. (2014). The potential effects of meditation on age-related cognitive decline: a systematic review. *Annals of the New York Academy of Sciences, 1307*(1), 89-103. doi:10.1111/nyas.12348

Grabovac, A. D., Lau, M. A., & Willett, B. R. (2011). Mechanisms of Mindfulness: A Buddhist Psychological Model. *Mindfulness, 2*(3), 154-166. doi:10.1007/s12671-011-0054-5

Gu, J., Strauss, C., Bond, R., & Cavanagh, K. (2015). How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review, 37*, 1-12. doi:10.1016/j.cpr.2015.01.006

Health Quality Ontario. (2012). Learning community: Advancing Improvement in primary care in Ontario.

Helmes, E., & Ward, B. G. (2017). Mindfulness-based cognitive therapy for anxiety symptoms in older adults in residential care. *Aging & Mental Health, 21*(3), 272-278. doi:10.1080/13607863.2015.1111862

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How Does Mindfulness Meditation Work? Proposing Mechanisms of Action From a

Conceptual and Neural Perspective. *Perspectives on Psychological Science, 6*(6), 537-559. doi:10.1177/1745691611419671

Hughes, T. F., Chang, C.-C. H., Bilt, J. V., Snitz, B. E., & Ganguli, M.. (2012). Mild Cognitive Deficits and Everyday Functioning Among Older Adults in the Community: The Monongahela-Youghiogheny Healthy Aging Team Study. *The American Journal of Geriatric Psychiatry, 20*(10), 836-844. doi:10.1097/JGP.0b013e3182423961

Hum, S., Cohen, C., Persaud, M., Lee, J., Drummond, N., Dalziel, W., & Pimlott, N. (2014). Role expectations in dementia care among family physicians and specialists. *Canadian geriatrics journal : CGJ, 17*(3), 95.

Im, S., Stavas, J., Lee, J., Mir, Z., Hazlett-Stevens, H., & Caplovitz, G. (2021). Does mindfulness-based intervention improve cognitive function?: A meta-analysis of controlled studies. *Clinical Psychology Review, 84*, 101972. doi:https://dx.doi.org/10.1016/j.cpr.2021.101972

Jessen, F., Amariglio, R. E., Buckley, R. F., van der Flier, W. M., Han, Y., Molinuevo, J. L., Rabin, L., Rentz, D. M., Rodriguez-Gomez, O., Saykin, A. J., Sikkes, S. A. M., Smart, C. M.; Wolfsgruber, S., Wagner, M. (2020). The Characterisation of Subjective Cognitive Decline. *Lancet neurology, 19*(3), 271–278. https://doi.org/10.1016/S1474-4422(19)30368-0.

Johansson, M. M., Marcusson, J., & Wressle, E. (2015). Cognitive impairment and its consequences in everyday life: experiences of people with mild cognitive impairment or mild dementia and their relatives. *International psychogeriatrics / IPA, 27*(6), 949-958. doi:10.1017/S1041610215000058

Joosten-Weyn Banningh, E. W. A., Vernooy-Dassen, M. J. F. J., Olde Rikkert, M. G. M., & Teunisse, J. P. W. M. (2008). Mild cognitive impairment: coping with an uncertain label. *International Journal of Geriatric Psychiatry, 23*(2), 148-154. doi:10.1002/gps.1855

Kabat-Zinn, J., & University of Massachusetts Medical Center/Worcester. Stress Reduction, C. (2009). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness* (Delta trade pbk. reissue, 15th anniversary ed.). New York, N.Y: Delta Trade Paperbacks.

Kearney, D. J. (2020). Mindfulness training for primary care patients promotes chronic disease self-management behaviours. *Evidence-based nursing, 23*(4), 118-118. doi:10.1136/ebnurs-2019-103131

Khalsa, D. S. (2015). Stress, Meditation, and Alzheimer's Disease Prevention: Where The Evidence Stands. *Journal of Alzheimer's disease : JAD - Journal Article, 48*(1), 1.

Khoury, B., Sharma, M., Rush, S. E., & Fournier, C. (2015). Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *Journal of psychosomatic research, 78*(6), 519-528. doi:10.1016/j.jpsychores.2015.03.009

Kok, R. M., & Reynolds, C. F. (2017). Management of Depression in Older Adults: A Review. *JAMA, 317*(20), 2114-2122. doi:10.1001/jama.2017.5706

Kor, P. P. K., Liu, J. Y. W., & Chien, W. T. (2019). Effects of a modified mindfulness-based cognitive therapy for family caregivers of people with dementia: A pilot randomised controlled trial. *International journal of nursing studies, 98*, 107-117. doi:10.1016/j.ijnurstu.2019.02.020

Kovach, C. R., Evans, C.-R., Sattell, L., Rosenau, K., & Gopalakrishnan, S. (2018). Feasibility and Pilot Testing of a Mindfulness Intervention for Frail Older Adults and Individuals

With Dementia. *Research in gerontological nursing, 11*(3), 137-150. doi:10.3928/19404921-20180223-01

Kurth, F., Zsadanyi, S. E., & Luders, E. (2021). Reduced age-related gray matter loss in the subgenual cingulate cortex in long-term meditators. *Brain imaging and behavior*. doi:https://dx.doi.org/10.1007/s11682-021-00578-6

Larouche, E., Chouinard, A.-M., Goulet, S., & Hudon, C. (2016). O3-10-02: Mindfulness-Based Intervention Prevents Memory Decline and Improves Mood and Quality of Life in Older Adults with Mild Cognitive Impairment: Preliminary Findings. *Alzheimer's & dementia, 12*, P310-P310. doi:10.1016/j.jalz.2016.06.562

Law, M., & Canadian Association of Occupational, T. (2005). *Canadian Occupational Performance Measure* (4th ed.). Ottawa, Ont: Canadian Association of Occupational Therapists.

Lazar, S. W., Kerr, C. E., Wasserman, R. H., Gray, J. R., Greve, D. N., Treadway, M. T., . . . Fischl, B. (2005). Meditation experience is associated with increased cortical thickness. *NeuroReport, 16*(17), 1893-1897. doi:10.1097/01.wnr.0000186598.66243.19

Lee, E.-H. (2012). Review of the Psychometric Evidence of the Perceived Stress Scale. *Asian Nursing Research, 6*(4), 121-127. doi:10.1016/j.anr.2012.08.004

Lee, L., Hillier, L. M., Heckman, G., & Gagnon, M. (2014). Primary Care-Based Memory Clinics: Expanding Capacity for Dementia Care. *Canadian Journal on Aging, 33*(3), 307-319. doi:10.1017/S0714980814000233

Lenze, E. J., Hickman, S., Hershey, T., Wendleton, L., Ly, K., Dixon, D., . . . Wetherell, J. L. (2014). Mindfulness-based stress reduction for older adults with worry symptoms and cooccurring cognitive dysfunction: MBSR in older adults. *International Journal of Geriatric Psychiatry, 29*(10), 991-1000. doi:10.1002/gps.4086

Levine, A. M. P., Emonds, E. E., Smith, M. A., Rickles, N. M., Kuchel, G. A., Steffens, D. C., Ohlheiser, A., Fortinsky, R. H. (2021). Pharmacist Identification of Medication Therapy Problems Involving Cognition Among Older Adults Followed by a Home-Based Care Team. *Drugs & aging*, *38*(2), 157–168. https://doi.org/10.1007/s40266-020-00821-7.

Li, S. Y. H., & Bressington, D. (2019). The effects of mindfulness-based stress reduction on depression, anxiety, and stress in older adults: A systematic review and meta-analysis. *International journal of mental health nursing, 28*(3), 635-656. doi:10.1111/inm.12568

Li, X. X., & Li, Z. (2018). The impact of anxiety on the progression of mild cognitive impairment to dementia in Chinese and English data bases: a systematic review and meta-analysis. *International Journal of Geriatric Psychiatry, 33*(1), 131-140. doi:10.1002/gps.4694

Logsdon, R. G., Gibbons, L.E. McCurry, S.,M., Teri, L. (1999). Quality of Life in Alzheimer's Disease: Patient and Caregiver Reports. *Journal of Mental Health and Aging, 5*(1), 21-32.

Lopez-Montoyo, A., Quero, S., Montero-Marin, J., Barcelo-Soler, A., Beltran, M., Campos, D., & Garcia-Campayo, J. (2019). Effectiveness of a brief psychological mindfulness-based intervention for the treatment of depression in primary care: study protocol for a randomised controlled clinical trial. *BMC psychiatry, 19*(1), 301-301. doi:10.1186/s12888-019-2298-x

Luck, T. P. D., Luppa, M. P. D., Wiese, B. D. M., Maier, W. M. D., van den Bussche, H. M. D., Eisele, M. P. D., . . . Riedel-Heller, S. G. M. D. (2012). Prediction of Incident Dementia: Impact of Impairment in Instrumental Activities of Daily Living and Mild Cognitive

Impairment—Results From the German Study on Ageing, Cognition, and Dementia in Primary Care Patients. *The American Journal of Geriatric Psychiatry, 20*(11), 943-954. doi:10.1097/JGP.0b013e31825c09bc

Mallya, S., & Fiocco, A. J. (2016). Effects of Mindfulness Training on Cognition and Well-Being in Healthy Older Adults. *Mindfulness, 7*(2), 453-465. doi:10.1007/s12671-015-0468-6

McCarney, R., Warner, J., Iliffe, S., van Haselen, R., Griffin, M., & Fisher, P. (2007). The Hawthorne Effect: a randomised, controlled trial. *BMC medical research methodology, 7*(1), 30-30. doi:10.1186/1471-2288-7-30

McCay, E., Frankford, R., Beanlands, H., Sidani, S., Gucciardi, E., Blidner, R., . . . Aiello, A. (2016). Evaluation of Mindfulness-Based Cognitive Therapy to Reduce Psychological Distress and to Promote Well-Being: A Pilot Study in a Primary Health Care Setting. *SAGE Open, 6*(3), 215824401666954. doi:10.1177/2158244016669547

Molnar, F. J., Hutton, B., & Fergusson, D. (2008). Does analysis using "last observation carried forward" introduce bias in dementia research? *Canadian Medical Association journal (CMAJ), 179*(8), 751-753. doi:10.1503/cmaj.080820

Moore, R. C., Depp, C. A., Wetherell, J. L., & Lenze, E. J. (2016). Ecological momentary assessment versus standard assessment instruments for measuring mindfulness, depressed mood, and anxiety among older adults. *Journal of psychiatric research, 75*, 116-123. doi:10.1016/j.jpsychires.2016.01.011

Ortiz, J. A., Smith, B. W., Shelley, B. M., & Erickson, K. S. (2019). Adapting Mindfulness to Engage Latinos and Improve Mental Health in Primary Care: a Pilot Study. *Mindfulness, 10*(12), 2522-2531. doi:10.1007/s12671-019-01229-0

Pachana, N. A., Byrne, G. J., Siddle, H., Koloski, N., Harley, E., & Arnold, E. (2007). Development and validation of the Geriatric Anxiety Inventory. *International Psychogeriatrics, 19*(1), 103-114. doi:10.1017/S1041610206003504

Paller, K. A., Creery, J. D., Florczak, S. M., Weintraub, S., Mesulam, M. M., Reber, P. J., . . . Maslar, M. (2015). Benefits of Mindfulness Training for Patients With Progressive Cognitive Decline and Their Caregivers. *American Journal of Alzheimer's Disease & Other Dementias, 30*(3), 257-267. doi:10.1177/1533317514545377

Parsons, C. E., Crane, C., Parsons, L. J., Fjorback, L. O., & Kuyken, W. (2017). Home practice in Mindfulness-Based Cognitive Therapy and Mindfulness-Based Stress Reduction: A systematic review and meta-analysis of participants' mindfulness practice and its association with outcomes. *Behav Res Ther, 95*, 29-41. doi:10.1016/j.brat.2017.05.004

Perini, G., Cotta Ramusino, M., Sinforiani, E., Bernini, S., Petrachi, R., Costa, A. (2019). Cognitive Impairment in Depression: Recent Advances and Novel Treatments. *Neuropsychiatric disease and treatment*, *15*, 1249–1258. https://doi.org/10.2147/NDT.S199746

Petersen, R. C. (2011). Mild Cognitive Impairment. *The New England Journal of Medicine, 364*(23), 2227-2234. doi:10.1056/NEJMcp0910237

Petersen, R. C., Caracciolo, B., Brayne, C., Gauthier, S., Jelic, V., Fratiglioni, L., . . . Stressforskningsinstitutet. (2014). Mild cognitive impairment: a concept in evolution. *Journal of Internal Medicine, 275*(3), 214-228. doi:10.1111/joim.12190

Phelan, E., Williams, B., Meeker, K., Bonn, K., Frederick, J., Logerfo, J., & Snowden, M. (2010). A study of the diagnostic accuracy of the PHQ-9 in primary care elderly. *BMC family practice, 11*(1), 63-63. doi:10.1186/1471-2296-11-63

Rabin, L. A., Smart, C. M., Crane, P. K., Amariglio, R. E., Berman, L. M., Boada, M., . . . Sikkes, S. A. M. (2015). Subjective Cognitive Decline in Older Adults: An Overview of Self-Report Measures Used Across 19 International Research Studies. *Journal of Alzheimer's Disease, 48*, S63-S86.

Regan, B., & Varanelli, L. (2013). Adjustment, depression, and anxiety in mild cognitive impairment and early dementia: a systematic review of psychological intervention studies. *International psychogeriatrics / IPA, 25*(12), 1963. doi:10.1017/S104161021300152X

Reid, L. M., & MacLullich, A. M. J. (2006). Subjective Memory Complaints and Cognitive Impairment in Older People. *Dementia and Geriatric Cognitive Disorders, 22*(5-6), 471-485. doi:10.1159/000096295

Salvo, V., Kristeller, J., Montero Marin, J., Sanudo, A., Lourenço, B. H., Schveitzer, M. C., . . . Demarzo, M. (2018). Mindfulness as a complementary intervention in the treatment of overweight and obesity in primary health care: study protocol for a randomised controlled trial. *Trials, 19*(1), 277-277. doi:10.1186/s13063-018-2639-y

Schmidtke, K., & Hermeneit, S. (2008). High rate of conversion to Alzheimer's disease in a cohort of amnestic MCI patients. *International Psychogeriatrics, 20*(1), 96-108. doi:10.1017/S1041610207005509

Serpa, J. G., Taylor, S. L., & Tillisch, K. (2014). Mindfulness-based stress reduction (MBSR) reduces anxiety, depression, and suicidal ideation in veterans. *Med Care, 52*(12 Suppl 5), S19-24. doi:10.1097/MLR.0000000000000202

Shigemizu, D., Akiyama, S., Higaki, S., Sugimoto, T., Sakurai, T., Boroevich, K. A., . . . Ozaki, K. (2020). Prognosis prediction model for conversion from mild cognitive impairment to

Alzheimer's disease created by integrative analysis of multi-omics data. *Alzheimer's Research & Therapy, 12*(1), 145-145. doi:10.1186/s13195-020-00716-0

Silva, L. D. S. V. e., Silva, T. B. L. d., Falcão, D. V. d. S., Batistoni, S. S. T., Lopes, A., Cachioni, M., . . . Yassuda, M. S. (2014). Relations between memory complaints, depressive symptoms and cognitive performance among community dwelling elderly. *Revista de psiquiatria clínica, 41*(3), 67-71. doi:10.1590/0101-60830000000013

Slot, R. E. R., Sikkes, S. A. M., Berkhof, J., Brodaty, H., Buckley, R., Cavedo, E., . . . van der Flier, W. M. (2019). Subjective cognitive decline and rates of incident Alzheimer's disease and non-Alzheimer's disease dementia. *Alzheimer's & dementia, 15*(3), 465-476. doi:10.1016/j.jalz.2018.10.003

Smart, C. M., Segalowitz, S. J., Mulligan, B. P., Koudys, J., & Gawryluk, J. R. (2016). Mindfulness Training for Older Adults with Subjective Cognitive Decline: Results from a Pilot Randomised Controlled Trial. *Journal of Alzheimer's disease 52*(2), 757.

Smoski, M. J., McClintock, A., & Keeling, L. (2016). Mindfulness Training for Emotional and Cognitive Health in Late Life. *Current Behavioral Neuroscience Reports, 3*(4), 301-307. doi:10.1007/s40473-016-0097-y

Snapp, C., DeBusk, R., & Benn, R. (2014). A Whole System Approach to Caring for Chronic Disease Patients in Primary Care: A Six Month Mindfulness-Based Therapeutic Lifestyle Change Program. *The journal of alternative and complementary medicine (New York, N.Y.), 20*(5), A12-A121. doi:10.1089/acm.2014.5320.abstract

Timer, I. (2019). Insight Timer (version 2019) [Mobile Application Software]. Retrieved from https://insighttimer.com. In.

Tomaszewski Farias, S., Giovannetti, T., Payne, B., Marsiske, M., Rebok, G., Schaie, K., . . . Gross, A. (2018). Self-perceived Difficulties in Everyday Function Precede Cognitive Decline among Older Adults in the ACTIVE Study. *Journal of the International Neuropsychological Society*, 24(1), 104-112. doi:10.1017/S1355617717000546

Townsend, E. A., & Polatajko, H. J. (2013). *Enabling occupation II : advancing an occupational therapy vision for health, well-being and justice through occupation*. Ottawa: Canadian Association of Occupational Therapists.

Tran, T., Donnelly, C., Nalder, E. J., Trothen, T., & Finlayson, M. (2020). Occupational therapist-led mindfulness-based stress reduction for older adults living with subjective cognitive decline or mild cognitive impairment in primary care: a feasibility randomised control trial protocol. *BMJ Open, 10*(6), e035299. doi:10.1136/bmjopen-2019-035299

Tuntland, H., Aaslund, M. K., Espehaug, B., Førland, O., & Kjeken, I. (2015). Reablement in community-dwelling older adults: a randomised controlled trial. *BMC geriatrics, 15*(143), 145-145. doi:10.1186/s12877-015-0142-9

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 review, 13*(1), 1-264. doi:10.4073/csr.2017.11

Vollestad, J., Sivertsen, B., & Nielsen, G. H. (2011). Mindfulness-based stress reduction for patients with anxiety disorders: evaluation in a randomised controlled trial. *Behav Res Ther, 49*(4), 281-288. doi:10.1016/j.brat.2011.01.007

Wells, R. E., Kerr, C. E., Wolkin, J., Dossett, M., Davis, R. B., Walsh, J., . . . Yeh, G. (2013). Meditation for Adults with Mild Cognitive Impairment: A Pilot Randomised Trial. *Journal of the American Geriatrics Society, 61*(4), 642-645. doi:10.1111/jgs.12179

Wettstein, M., Seidl, U., Wahl, H.-W., Shoval, N., & Heinik, J. (2014). Behavioral Competence and Emotional Well-Being of Older Adults with Mild Cognitive Impairment: Comparison with Cognitively Healthy Controls and Individuals with Early-Stage Dementia. GeroPsych, 27(2), 55-65.

Whitfield, T., Barnhofer, T., Acabchuk, R., Cohen, A., Lee, M., Schlosser, M., . . . Marchant, N. L. (2021). The Effect of Mindfulness-based Programs on Cognitive Function in Adults: A Systematic Review and Meta-analysis. *Neuropsychology Review*. doi:https://dx.doi.org/10.1007/s11065-021-09519-y

Williams, J. M. G. (2010). Mindfulness and psychological process. *Emotion (Washington, D.C.), 10*(1), 1-7. doi:10.1037/a0018360

Wong, W. K., Boscardin, W. J., Postlethwaite, A. E., & Furst, D. E. (2011). Handling missing data issues in clinical trials for rheumatic diseases. *Contemporary Clinical Trials, 32*(1), 1-9. doi:10.1016/j.cct.2010.09.001

Wong, W. P., Coles, J., Chambers, R., Wu, D. B.-C., & Hassed, C. (2017). The Effects of Mindfulness on Older Adults with Mild Cognitive Impairment. *JAD reports*, *1*(1), 181-193. doi:10.3233/ADR-170031

Zuniga, K. E., Mackenzie, M. J., Kramer, A., & McAuley, E. (2016). Subjective memory impairment and well-being in community-dwelling older adults. *Psychogeriatrics, 16*(1), 20-26. doi:10.1111/psyg.12112

Chapter 6: Discussion

Introduction

This chapter summarizes key findings from the dissertation and offers critical implications, future research directions, and recommendations for practice and policy. As an occupational therapist working mainly in primary care and seeing clients across the lifespan for over 20 years, I increasingly noted the experience of cognitive decline and the risk of functional limitations. In addition, I noted there were few non-pharmacological interventions that I as an occupational therapist, could offer that enhanced the psychological and functional outcomes of the individuals with subjective cognitive decline (SCD) or mild cognitive impairment (MCI).

Primary care-based occupational therapists are well-positioned to support this growing population by providing interventions to enhance psychological well-being and mitigate functional limitations (Belchior et al., 2015; Donnelly et al., 2022). To prepare occupational therapists to better meet the needs of individuals with cognitive decline, it is imperative to explore evidence-based interventions that can be used specifically for this growing population. As a result, I sought to conduct research on a potential intervention that I could offer in primary care and that would ultimately support older adults' function in their community. This dissertation had two aims. The primary aim of this dissertation was to explore the feasibility of conducting an RCT of an occupational therapist-led, 9-week MBSR program for community-dwelling older adults with cognitive decline in interprofessional primary care (IPC) setting. The secondary aim was to evaluate the effect sizes of older adults' perceived satisfaction with functional performance as measured by the Canadian Occupational Performance Measure (COPM) and psychological outcomes.

This dissertation will hopefully impact the occupational therapy profession and further the discussion about how best to engage in occupational therapy services to promote healthy aging among older clients.

Summary of Findings

Chapter 4 - Feasibility: *Mindfulness-Based Stress Reduction for community-dwelling older adults with subjective cognitive decline (SCD) and mild cognitive impairment (MCI) in primary care: A mixed-methods feasibility randomized control trial*

This study aimed to determine the feasibility of conducting an RCT of an occupational therapist-led MBSR program delivered in a team-based IPC setting. The secondary objective was to examine the acceptability of using technology (e.g., computer tablet and App Insight Timer®) as a tool for program delivery and home practice in a team-based primary care setting using mixed methods.

Our study noted low attrition (n = 3), high enrollment (75%) and high follow-up rates (100%). However, based on our lower-than-expected feasibility outcomes, our recruitment rate was not met (27 participants recruited, rather than the a priori determined number of at least 30). Similarly, the retention rate was not met (64.3%, which was below the specified 75-80%), and true adherence rate, was not met (50%, also below the deemed specified moderate adherence rate of 51-79%). Based on these findings, we concluded that our currently designed study does not support the feasibility of a full RCT. However, with minor modifications to the design, such as changing how participants who drop-out are analyzed, extending recruitment, and adding multiple sites, this intervention has the potential to be well-suited to study further using a full-scale RCT. Additionally, the qualitative findings suggest that MBSR is feasible for clinical practice, in an IPC setting based on Theme 2 of *Satisfaction and Perceived Benefits* of MBSR among our older adult participants with SCD or MCI. Participants noted benefits in *mental health*, *social support*, *personal insight of self-care, learning to respond to stressful situations versus reacting, an alternative to medication* (e.g., *pain management, stress management etc.*), and the MBSR program taught participants that it *is more than memory, it's about life*. Last, the qualitative findings from this study also revealed Theme 1, the *Unique Features of Primary Care*, *highlighting* the subtheme of trust and feeling safe with staff and institution. This study contributes knowledge of how interprofessional health care providers, such as occupational therapists, can provide MBSR to support the older adult population experiencing cognitive decline in a primary care setting.

For the second objective of this study, we found the use of App-based technology and computer tablets *acceptable* among our study participants and occupational therapists in Theme 3. Participants also appreciated the *portability* nature of the tablets as they utilized their computer tablets consistently until the study's end. Our findings demonstrated that older adults with SCD or MCI were highly receptive to learning how to use technology thus, future group-based intervention programs may also consider incorporating tablet use in an IPC setting for both program delivery and potential data collection for future research.

Chapter 5- Everyday Activities: *Occupational therapist-led mindfulness training program for older adults living with early cognitive decline in primary care: A pilot randomized controlled trial*

The aim of this study was to evaluate whether mindfulness practice can improve perceived performance and satisfaction with everyday activities and secondary psychological outcomes in older adults experiencing cognitive decline in a primary care setting. The findings from this pilot RCT investigation (n = 14; MBSR) and (n = 13; WLC) found a reduction in anxiety but did not show a statistically significant improvement in either perceived performance or perceived satisfaction on the COPM. However, the COPM did show significant time effects on the *performance* (average scores) over the three-time points on the MANOVA and an interesting finding of $p > 0.06$ on COPM *satisfaction* average scores at week-13 on follow-up using an independent t-test between groups at three different time points. Further exploration of the COPM with a fully powered trial may be worthwhile. In essence, this study demonstrated that MBSR is a promising primary care intervention for those living with early cognitive deficits. With minor modifications to the current design (e.g., extending the recruitment period and adding multiple sites, and changing how dropouts are analyzed), this study is well suited for a full-scale RCT.

This study warrants the pursuit of a future study to explore how long the reduced anxiety effects would be sustained. Second, whether sustained reduction in anxiety would support improvements in the performance of everyday life activities among older adults living with cognitive decline in an IPC setting. Due to the COVID-19 pandemic, future research may consider evaluating mindfulness training among older individuals living with long COVID-19 and experiencing brain fog. Further, future research may consider using mindfulness as a coping strategy for those living with long COVID-19 and experiencing debilitating symptoms that impact everyday life activities, may be worthwhile to pursue within a primary care context.

Primary Care Service Delivery Models, Roles and Practice Implications

Patient Medical Home (PMH)

Primary care has undergone a significant transformation to meet the evolving needs of Canadians in the past 20 years (Donnelly et al., 2022). Models of IPC have been introduced across Canada to support changing demographics, including the aging population. Models of

IPC were introduced to provide more comprehensive and coordinated team-based care (College of Family Physicians of Canada, 2019; Donnelly et al., 2022; Hutchison et al., 2011).

A vision for Canada to have team-based primary care as its foundation is a patient medical home (PMH). PMH is defined, "as the place [patients] feel most comfortable presenting and discussing their personal and family health and medical concerns" (College of Family Physicians of Canada, 2019). Across Canada, the expansion of primary care teams has led every province to embrace PMH and its core function of comprehensive team-based care (College of Family Physicians of Canada, 2019; Donnelly et al., 2022). The philosophy of comprehensive team-based care aligns well with community-dwelling older adults experiencing early cognitive deficits as there has been a shift of emphasis given the critical need for a multidisciplinary approach for early detection and recognition of cognitive decline to address the needs of an aging population. One of the barriers to the early detection and management of patients with cognitive decline by primary care physicians is a lack of knowledge, skills, time and support from allied health care professionals (Parmar, 2012). As such, this dissertation has demonstrated that occupational therapists using MBSR is feasible in practice in supporting older adults with early cognitive deficits within a PMH model. Thus, this dissertation highlighted that occupational therapists could be leveraged in supporting older adults with early cognitive deficits in primary care from a team-based perspective.

In Ontario, examples of primary health care models include family health teams (FHTs), community health centres, enhanced fee-for-service models, including family health groups and the comprehensive care model. Other primary care models that are not interprofessional team-based include family health organizations, family health networks and straight fee-for-service practices (Glazier et al., 2015). Since the emphasis of every province is to embrace PMH, the model that aligns with the PMH framework in Ontario is the family health team (FHT). As such, the focus of research on team-based care, such as in a FHT, would be fruitful. The FHT is comprised of physicians, nurses, nurse practitioners, and other health care professionals, including occupational therapists. Increasing funding to support more FHTs across Ontario is critical to support older adults. As part of the IPC setting, occupational therapists can practice at full scope by enacting the core elements of primary care. However, according to Donnelly et al., (2022), one of the barriers to occupational therapy's integration within primary care is that occupational therapists themselves lack an understanding of primary care and its philosophies. This lack of understanding may result in a risk of oversimplification by "transferring approaches used in community and institutional settings, rather than building evidence and models of practice that can support occupational therapists in developing new primary care service delivery models, roles and practices" (Donnelly et al., 2022). As such, the occupational therapist's role in an IPC setting has two notable implications for the understanding of primary care and its philosophies. First, it is crucial that occupational therapy's role is built on evidence and, secondly, occupational therapists need to have a clear understanding of the service delivery context (Tse et al., 2003; Donnelly et al., 2022).

Starfield's Core Elements of Primary Care and Primary Care-based Memory Clinic

Occupational therapists' philosophy of client-centred holistic care (Townsend et al., 2013) aligns well with Starfield's core elements of primary care. Findings from this mixed methods feasibility RCT align well with Starfield's core elements of primary care. These core elements consist of (i) the first point of access to healthcare; (ii) long-term person (continual) focused care; (iii) comprehensive care; and (iv) coordinated care (Starfield et al., 2005).

First, it is essential to support timely identification and management of cognitive decline in primary care settings. Occupational therapists can assist this population through support and interventions that are client-centred at this *first point of contact* when patients have memory concerns in an IPC setting. Second, living with SCD or MCI has multiple clinical implications that need to be supervised and observed longitudinally. As such, Starfield's second core element of primary care is *long-term person (continual) focused care,* which is an essential element to support this population. Providing support over the long-term is an important consideration as living with early cognitive deficits may be life-altering, which may impact on functioning in their everyday activities and roles, which in turn, may impact on their QoL and well-being.

Findings from this dissertation's qualitative data highlighted that the occupational therapist-led MBSR program is feasible for practice in a primary care setting, which supports Starfield's third element of *comprehensive care*. For example, the qualitative findings from the MBSR focus group noted perceived benefits of participating in the intervention that include mental health, social support, increased insight on self-care, and the transfer of mindfulness practice to day-to-day activities. Second, qualitative findings from the MBSR focus group highlighted a theme of *trust* and *psychological safety with staff and institution.* The results highlighted the core element of receiving longitudinal care within a primary care setting. This care feature across the lifespan is a unique attribute of primary care that distinguishes it from other secondary (e.g., specialty clinics) and tertiary (e.g., hospital) care settings. Thus, the self-reported finding of *trust and psychological safety with staff and institution* with this older adult population is one factor that sets this form of long-term, continual care apart from other settings.

Starfield's last core element of primary care is *coordination*, whereby occupational therapists also facilitate services within the team of other health care professionals and the community to support capacity building and ensure quality assessment and management of cognitive decline. An example of such coordination could be a referral for further investigation or treatment (Starfield et al., 2005), for example, to a primary care-based memory clinic (PCBMC) (Lee et al., 2010).

As noted in the literature, those with SCD are between 3.5 and 4.5 times more likely to develop dementia after one to seven years (Caracciolo et al., 2013). Thus, early intervention can support individuals with early cognitive decline by ensuring patients, caregivers and their families have access to early detection, treatment, education, counselling and other resources. By doing so, PCMC interventions may delay cognitive decline, improve function, prevent crises, ease caregiver burden and delay institutionalization (Lee et al., 2014).

Occupational therapists can play an integral role by providing support within a PCMC that focuses on an individual's functioning in their everyday activities. Delivering MBSR as an adjunct, non-pharmacological intervention to support this population fulfills an essential gap as PCMC mainly focuses on assessments and diagnosis (Lee et al., 2014). Moreover, since occupational therapists focus on functional assessments, this may offer further diagnostic information. Last, occupational therapists may consider delivering MBSR as a multifactorial approach in that it can be provided not only to patients but also to caregivers and family members to manage and ease caregiver burden, which was shown to be beneficial in a recent systematic review (Shim et al., 2021). The coordination and collaborative nature of primary care are well suited to include the role of occupational therapy within a PCBMC, which will contribute to the overall delivery model of care for an aging population with SCD or MCI.

Secondary Health Promotion Attributes of the Occupational Therapy-led MBSR Program

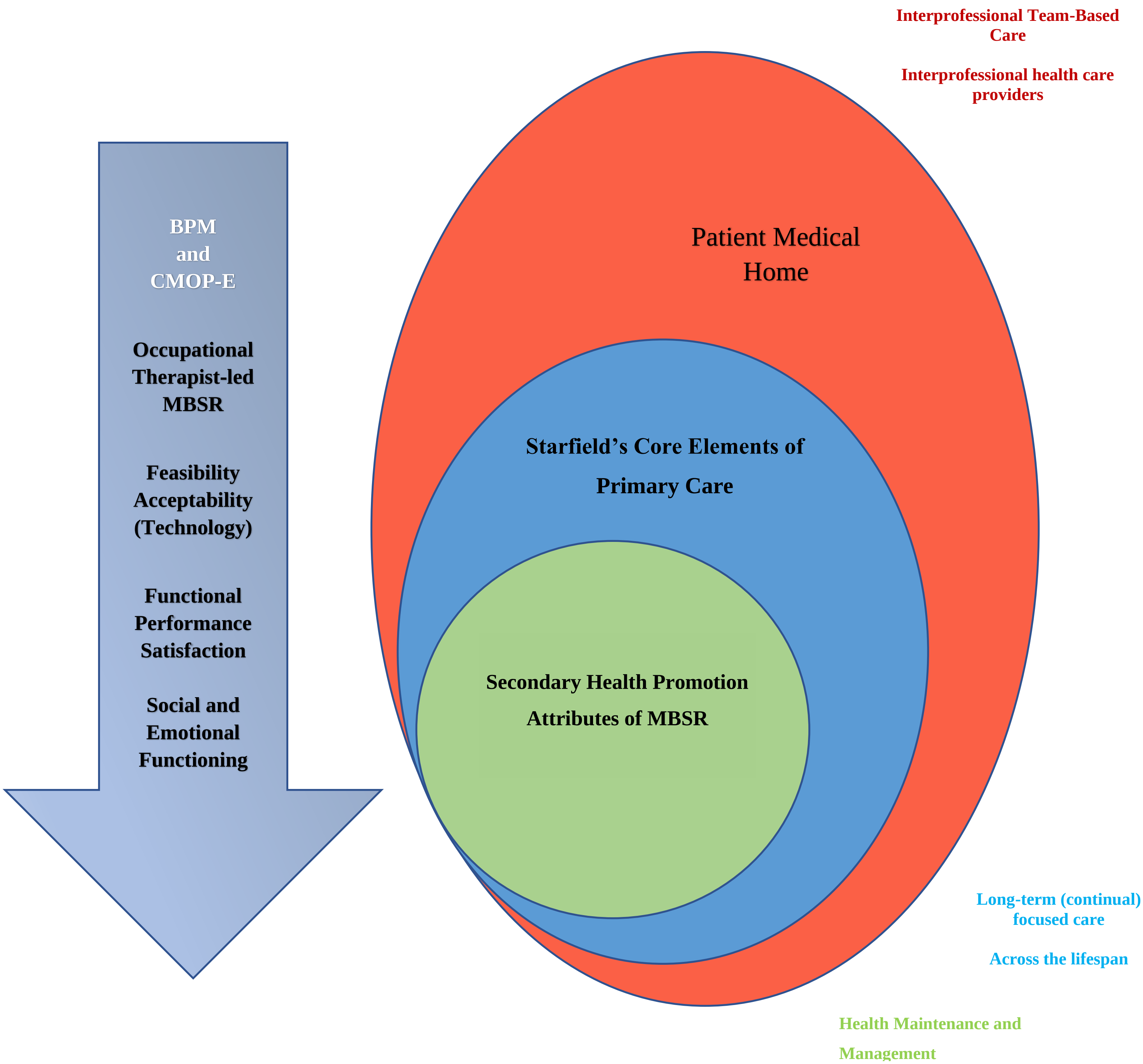
To meet the needs of this emerging population with early cognitive deficits, there is a need for greater emphasis on health promotion. This dissertation's findings support the validity Wilcock's (2006) health promotion model, as interventions such as MBSR seek to support older adults with early cognitive deficits by significantly reducing their anxiety. First, anxiety is a known risk factor for progression to dementia among people with MCI. Second, any intervention that reduces anxiety may also reduce the risk of dementia, as mentioned in a systematic review and meta-analysis (Li & Li, 2018). Therefore, based on the findings of our pilot RCT, anxiety reduction is critical as elevated anxiety relates to poorer cognitive performance, which is predictive of future cognitive decline (Beaudreau & O'Hara, 2008).

There are three levels of health promotion. The first level focuses on preventing damaging behaviours and illness, the second level supports individuals who are currently experiencing the health condition, and the third level addresses those individuals living with chronic disease and disability (Donnelly et al., 2022). To focus on the second level, older adults experiencing early cognitive deficits may benefit from interventions such as mindfulness to influence behaviour change and to slow down or prevent further disease and disability. From this secondary health promotion level, the MBSR program can support individuals with early cognitive decline by promoting healthy lifestyles (i.e., emphasis on self-care), including lifestyle modifications (i.e., self-acceptance and their level of cognitive ability and self-compassion) and also by facilitating them to self-manage their memory concerns (i.e., reducing anxiety) (Donnelly et al., 2022; Wilcock & Hocking, 2015). MBSR may further increase one's awareness of how stressors impact cognition and enhance the ability to cope with one's overall health.

MBSR situates well within primary care taking the burden off physicians and promoting interprofessional team-based care. MBSR would be well aligned in primary care strategies to foster health and well-being for individuals with SCD and MCI (Lee et al., 2014; Wagner, 1996; Pati et al., 2017). It could be argued that interprofessional health care providers leverage trust and promote feelings of safety to support further health promotion. Thus, this dissertation provided essential insight into how best to engage occupational therapy services such as the MBSR program within a PMH. It also demonstrates how doing so may strengthen the role of occupational therapy within primary care and contribute to the evolving field of aging in Canada.

See **Figure 6.1:** MBSR is embedded within an interprofessional team-based PMH to support older adults with early cognitive decline from a secondary health promotion perspective and help them cope and self-manage within primary care.

Figure 6.1: MBSR Health Service Delivery Model



Critical Clinical Implications for Occupational Therapists

Technology as the new instrumental of activities of daily living (iADL)

In 2016, Hedman et al. (2016) suggested that future studies should test the feasibility of technology use (e.g., such as computer tablets) among older adults with cognitive decline (Hedman et al., 2016). This dissertation confirmed that using computer tablets is acceptable among older adults with cognitive decline; specifically, they liked its portability. There are important reasons to embed technology in a primary care setting.

First, primary care clinicians can assess older adults with cognitive decline by their ability to use technology and the frequency of everyday technology use (Hedman et al., 2017) as part of their overall assessment. Everyday technology use, such as appliances, remote controls, internet/telephone banking, and smartphone and computer tablets, is essential to consider when assessing older individuals (Knopman & Petersen, 2014). If the older adult's ability and frequency of technology use have changed, this could indicate further cognitive decline with concomitant decreased functioning (Hedman et al., 2018).

Second, technology use among persons with cognitive decline may support their everyday functioning. However, the evidence supporting technology to enhance the performance in everyday activities warrants further investigation because the evidence is limited (Patomella et al., 2018). Thus, future studies should explore how technology-based applications may improve functional performance in older adults with cognitive decline to help them age-in-place more successfully.

Last, further research into technology use in primary care may be beneficial to test its clinical application in fall detection, ambient-assisted living (Gettel et al., 2021) or home monitoring and dementia care (activities of daily living [ADL] functioning) for at-risk older adults.

During the COVID-19 pandemic, many older adults in isolation had challenges in connecting and communicating with others. Still, social technologies allowed them to secure food, safety and security while maintaining their health and their social connectedness (Castillo et al., 2021). However, older adults living in long-term care facilities were found to be more at risk for isolation, as family caregivers and visitors often were barred from visiting, which contributed to the onset of or further intensified depression, including feelings of despair and, in older adults with cognitive impairment, further cognitive decline (Bradford et al., 2009).

Videoconferencing applications, like Skype, Facetime, or Zoom, were used on computer tablets to connect older adults with their families and friends. Technology was beneficial for long-term care residents; however, the pandemic also highlighted barriers to its use, including (i) the lack of access due to a limited number of iPads to share among residents, (ii) lack of hand dexterity to steadily hold a tablet, (iii) residents were looking up at the ceiling instead of focusing on their loved ones' face, and lastly, (iv) many older adults lacked the technical proficiency to use such devices, especially those with limited cognition (Bains, 2020; Chu et al., 2020; Klein, 2020).

We noted similar challenges in our study. Our occupational therapists supported our participants with SCD or MCI by providing verbal cueing, going over instructions, and repeating this process one-on-one several times to help them use their computer tablets. Some challenges noted with our participants included difficulty: (i) accessing or connecting to WIFI, (ii) accessing the App-based technology for home practice and (iii) navigating the computer tablet itself.

To make it easier for our older participants to use the computer tablet, we removed: (i) log-in password, (ii) unnecessary Apps, (iii) perception effects (e.g., reduced motion effects); and (iv) increased lighting and lastly, (v) used a protective case to prevent tablet damage, if dropped.

Our qualitative findings from the semi-structured interviews of occupational therapists also highlighted the acceptability of technology such as an iPad and App for intervention delivery and data collection with community-dwelling older adults experiencing early cognitive deficits. The findings highlighted that the study intervention could be delivered in a discrete and focused manner specific to primary care patients with SCD or MCI. Furthermore, technology (i.e., computer tablets, iPads) within primary care can be used to coordinate services with other team-based IHPs or others within the circle of care. Lastly, since computer tablet use was found acceptable for program delivery and data collection, this technology may be used in primary care for patient data collection and coordination of data for both clinical applications and research.

This dissertation evaluated technology use among older adults with SCD or MCI, which further adds to the aging field (Mahlo & Windsor, 2021). There is currently limited understanding of technology use in primary care, and this research will add a new understanding of its applicability from a health delivery model.

Methodological Reflection and Lessons Learned

The prime motivation to conduct research with this methodology was that few non-pharmacological interventions are available to older adults with SCD or MCI, rendering the pilot-RCT of an MBSR program for this population particularly pertinent. As such, choosing the mixed-methods feasibility RCT design maximized the strengths of the methodology's quantitative and qualitative aspects. Thus, this dissertation was grounded in mixed methods, pairing a pilot-RCT with individual semi-structured interviews and a focus group to provide further insights into the how and why of the intervention. By bringing in both qualitative and quantitative methods, this dissertation compared and interpreted the findings more extensively than would have been the case by focusing exclusively on qualitative or quantitative methods. For example, Chapter 4 demonstrated perceived benefits in mental health (qualitative findings), and Chapter 5 revealed statistically significant anxiety reduction levels (quantitative findings), thus helping participants effectively cope with SCD or MCI. As such, these mixed methods provided more depth and breadth to the overall findings of the dissertation. Furthermore, the qualitative data from the MBSR focus group and individual health care providers' interviews provided a rich depiction of the benefits and importance of team-based care in an IPC setting.

However, since our study was not feasible likely due to design issues with having a short recruitment period and how drop-out was analyzed, moving forward, there will need to be some refinement to increase feasibility in a future clinical trial. The first refinement is to have a longer recruitment time frame, such as six months instead of 4.5 months, which could have boosted our study's participation (i.e., recruitment rate). In addition, recruiting from multiple FHTs would be another option to achieve the recruitment rate. Although, in hindsight, conducting a smaller MBSR group was clinically appropriate since older adults with cognitive decline require more of the MBSR teachers' time, attention and support, especially in learning how to use computer tablets. Second, our study retention rate priori was the completion of six or more sessions > 75%. However, in reflection, the retention rate should have been defined as the completion of the 9-week intervention and follow-up, which would have been more accurate and similar to other feasibility studies (Akinci et al., 2022; Smith-Turchyn et al., 2020). Last, our study's true adherence rates were low at 50%, but excluding those that withdrew, our adherence would have been 64%, achieving our moderate adherence rate priori of 51-79%.

Similar to other RCTs we encountered two significant study issues: i. nonadherence and ii. missing outcomes data (Gupta, 2011). In this study, we used the Intention-to-Treat (ITT) analysis and the last observation carried forward (LOCF) method to manage missing data, such as those participants who withdrew from the study (MBSR; N = 3) and (WLC; N = 1). ITT has been described as "once randomized, always analyzed" (Gupta, 2011; Kruse et al., 2002), and in this case, the benefit of using ITT is that it preserves the sample size and, ultimately, statistical power. In addition, ITT preserves the balance between participants in the intervention and control groups achieved through randomization, which minimizes selection bias and confounding (Alshurafa et al., 2012). However, there are some disadvantages in using ITT; first, LOCF assumes that there is no improvement after dropping out in both the intervention group and WLC, which may underestimate actual change or increase the difference between the two groups. In this case, there may be a bias when more participants drop out of the WLC group, the better the intervention group may appear. Last, the preference for LOCF is more prominent in trials where the goal of treatment is not to improve a condition but to slow decline, such as in Parkinson's and Alzheimer's disease. Dementia trials use LOCF nearly 60% of the time compared to 19% in other fields (Streiner, 2014). However, it can be argued that using LOCF in this dissertation was consistent with other published research.

Another significant contribution of this dissertation that was highlighted using a mixed methods approach was the acceptability of (i) computer tablets (i.e., iPads) and (ii) Apps for program delivery and data collection. However, the App could not to capture informal practices, requiring the use of self-reported home practice diary sheets to collect this data. Informal practices were vital as they demonstrated mindfulness practices learned in the weekly sessions being transferred to everyday activities in the real world. The home practice diary sheets, in conjunction with the MBSR focus group results, indicated that participants transferred their new mindfulness skills to everyday activities, such as noticing the movement of walking when one is walking. One participant (P#27, age 60) stated when paying attention to walking, “I never thought about walking being as complex and difficult as it is”.

Last, this dissertation also demonstrated that the App (Insight Timer) was not Wi-Fi dependent. In other words, Wi-Fi access was not necessary for data collection as the tablet collected data on the formal practices of participants in real-time or synchronously and stored them on the App itself. The real-time data was uploaded once participants had access to Wi-Fi during our on-site weekly sessions and then automatically uploaded online. However, the only risk is if any participant lost their tablet, all of their data on the App would be lost.

As the study proceeded, changes were made to the original protocol. First, the inclusion criteria were updated to clarify how MCI was determined. Initially, an MCI diagnosis in the Electronic Medical Record (EMR) would meet the study’s eligibility. However, six participants had no MCI confirmation in the EMR, but their MoCA score was ≤ 25, as a result, the use of Horton’s et al.’s (2015) MCI MoCA cut-off = 20-25 was amended for them. Observing the lack of MCI diagnosis on the EMR was related to the literature indicating that primary care physicians lack confidence in their diagnostic skills and believe that MCI and early dementia diagnosis require specialist consultation (Connolly et al., 2011; Lee et al., 2014). They were, therefore, reluctant to provide a diagnosis.

On the other hand, none of the participants in this study had an SCD diagnosis in their EMR. Thus, to assess for SCD, we used Jessen et al.’s (2020) criteria in conjunction with

Horton's et al.'s cut-off MoCA score of ≥ 26 to ensure objectively that participants did not have MCI. As the primary care population ages, a future research opportunity could be to evaluate strategies to support confidence in diagnostic skills among primary care physicians to confirm an SCD or MCI diagnosis.

Another change to the original protocol was an increase in the retention rate from completing 6 ≥ of the 9 sessions to 6 ≥ of the 10 sessions to capture the orientation session. This change was made because the orientation session was structured similarly to the other weekly sessions (provided in a three-hour group format). Whereas, unlike in this dissertation, other MBSR studies did not include orientation sessions as the latter were conducted individually, in a one-hour format and, at times, right after the randomization process (Alsubaie et al., 2018; Juul, Pallesen, Bjerggaard, Nielsen, & Fjorback, 2020).

Taken together, the present study was designed as a feasibility RCT to determine whether an occupational therapy-led MBSR program in a primary care setting is appropriate for a future larger clinical trial. Based on the preliminary results of interaction and time effects on some of the outcome measures with a significant reduction in anxiety post-intervention, a fully powered larger clinical trial of a similar nature would be appropriate to explore in the future. Similar to the present study's design, preparing in advance a detailed study protocol with a procedure manual, realistic timelines and appropriate data collection forms would be highly recommended to meet the complexity of the RCT and the required tasks (Guerrera et al., 2017).

Based on this current study, the following consideration is recommended for a future larger clinical trial:

(i) Extending the follow-up beyond four weeks to six months or longer, if realistic, to determine the effectiveness of clinical health outcomes (e.g., anxiety etc.) can be sustained over a period of time, will highlight the benefits of mindfulness training, if any.

(ii) Consider modifying criteria eligibility to include participants with no mindfulness experience to determine evidence of a strong cause-effect relationship on health outcomes if one exists.

(iii) Consider factors such as under-recruitment and loss to follow-up.

(iv) Determine the appropriate sample size for each clinical outcome measure (e.g., see Chapter 5 for sample size estimation for the primary clinical outcome of the COPM).

(v) Consider exploring cost analysis with MBSR intervention as there is minimum (e.g., book, CD) to no cost to practicing mindfulness other than an individual's time and commitment.

(vi) Consider using other self-reported outcomes measures with a focus on SCD, such as Memory Complaints Questionnaire (Crook, Feher, Larrabee, 1992), Metamemory in Adulthood Questionnaire (McDonough et al., 2020), and Memory Self-Efficacy Questionnaire (Berry et al., 1989) as to demonstrate the possible utility of how mindfulness training may increase self-efficacy of older adults experiencing early cognitive complaints such as in SCD, similar to other studies leveraging mindfulness with a similar population (Smart et al., 2016).

(vii) Ensure data collection forms (e.g., REB consent form) are concise in length to facilitate the ease of comprehension for this older adult population with SCD or MCI.

Conceptual Theoretical Framework for MBSR and Occupational Therapy

The Buddhist Psychological Model (BPM) proposed by Grabovac et al. (2011) provided a framework that described the underlying mechanism of mindfulness and the changes in cognitive processes that occur with mindfulness training. According to the BPM, the three mechanisms of mindfulness that influence cognitive processes include (1) insight, (2) attention regulation and (3) acceptance/compassion (Grabovac et al., 2011). Overall, the BPM provided a framework that described how mindfulness training may influence self-report changes in clinical outcomes, such as a significant reduction in anxiety post-MBSR found in this study. The BPM provided a contextual understanding of the mechanism of change from a cognitive process, thus providing a helpful framework that informed this dissertation. Second, the Canadian Model of Occupational Performance and Engagement (CMOP-E) provided a functional perspective in which to ground mindfulness practice and examine its impact on the performance of everyday activities (Townsend & Polatajko, 2013).

To understand the impact of mindfulness on functioning in daily life, the conceptual frameworks of the BPM and the CMOP-E (Cole & Tufano, 2008; Grabovac et al., 2011; Townsend & Polatajoko., 2013) were considered to describe the mechanism of mindfulness training and its impact on clinical symptoms. For example, using the BPM and the CMOP-E to evaluate self-perceived performance and satisfaction of their performance on everyday functioning, using an occupational therapy perspective. Furthermore, as mentioned in Chapter 1, there is emerging research exploring how mindfulness influences engagement in occupation within a context of "doing" occupations as well as "being" in everyday life participation that may have positive benefits (Goodman et al., 2019). Second, the emerging evidence notes the positive benefits of mindfulness on occupational engagement, which can benefit this population.

In the past 30 years, mindfulness research has focused solely on cognitive processes and psychological outcomes. Emerging studies from the mindfulness literature suggest a positive association between mindfulness training and ADL among older adults with neurodegenerative conditions, such as MCI and Parkinson's disease (Advocat et al., 2016; Wong et al., 2017). However, this association has not been thoroughly researched, and the evidence is limited. Moreover, recent systematic reviews and meta-analyses examine the effectiveness of mindfulness-based interventions (MBIs) on ADL or functional abilities among older adults with cognitive decline (Hoffman et al., 2020; Nagaoka et al., 2021). As older adults with SCD or MCI age, they may disengage in their everyday activities related to their decreased level of cognitive performance. Thus, occupational therapists should explore such interventions that could support occupational engagement or functional outcomes, an essential indicator of healthy aging (Beard et al., 2016) among this growing population.

Using the BPM theoretical framework and building upon it to include an occupational therapy lens of function with the CMOP-E (Hoffman et al., 2020; Townsend & Polatajko., 2013) provides a new perspective on mindfulness and its implications for ADL or functional abilities. Therefore, the overall framework of this dissertation sought to explore mindfulness training and the perceived performance and satisfaction of everyday life activities among older adults with SCD or MCI. The occupational therapy literature notes that mindfulness may improve occupational engagement and provide the foundation for the optimal occupation experience (Elliot, 2011; Hoffman et al., 2020).

When using both the BPM and the CMOP-E, this study uncovered an interesting finding in the affective domain, namely a main theme of satisfaction and perceived benefits of MBSR with subthemes around mental health benefits, social support, insight on self-care, responding versus reaction, and adopting mindfulness practice to everyday activities. This main theme of satisfaction and perceived benefits of MBSR demonstrates the benefits of using this intervention for those living with SCD or MCI.

In addition, the quantitative strand from the feasibility RCT revealed a significant anxiety reduction, which supports the qualitative data from the MBSR focus group. This dissertation adds to this body of literature as it notes satisfaction and optimizing the affective domain of functioning, which is crucial to supporting social and emotional functioning. Bringing in the CMOP-E further frames the results that MBSR can be used to promote social and emotional functioning, which could have significant clinical applications within primary care settings for this population. The interpretation of coping could be expanded when using the lens of the CMOP-E to interpret further the overall findings that impact the affective domain.

Using both the BPM and the CMOP-E may support future research in evaluating how MBSR impacts other variables when living with cognitive decline, such as SCD or MCI. Future mindfulness research addressing functional performance could consider using the two theoretical frameworks proposed in this dissertation. The BPM focuses on the psychological component, whereas the CMOP-E focuses on functional performance and brings a rehabilitation perspective. This dual framework would be an essential contribution to future research to explore further successful aging (Rowe & Kahn, 1997) and healthy aging (Beard et al., 2016), emphasizing occupational engagement and functional outcomes. A few functional performance outcome measures that may be valuable to explore based on a recent systematic review with community-dwelling older adults include (i) the Katz Index of Independence in Activities of Daily Living, (ii) the Lawton Instrumental of Activities of Daily Living Scale, and (iii) the Texas Functional Living Scale (Pashmdarfard & Azad, 2020). Furthermore, the dual framework supports future occupational therapy research to explore how engaging in occupation mindfully may influence various health outcomes such as affective, cognitive, behavioural or spiritual, which would be worthwhile to explore.

Next steps for a future RCT: Cognitive decline and functional implications

A future full-scale RCT is recommended with the changes to our study design to account for the findings of this study. Although this dissertation revealed no significant effects on self-perceived performance or satisfaction by older adults living with SCD or MCI through mindfulness training, there was a statistically significant reduction in anxiety compared to the control group, which has significant research and clinical implications. First, future research is warranted to explore how long anxiety reduction can be maintained over the long-term. Second, this dissertation did not capture whether significant, sustained anxiety reduction improves functioning, such as self-perceived performance and satisfaction; it may be worth exploring in a future RCT. Similarly, findings in the literature note that positive effects, such as reduced anxiety experienced by older adults, must be evaluated longitudinally (Li & Bressington, 2019). Consequently, a future trial with a longer follow-up with different ADL measurements to assess the impact of MBSR on functional performance and satisfaction among older adults with cognitive decline is warranted. Last, future research on MBSR could be used to evaluate a unique population of older adults living with long COVID-19 experiencing brain fog or other debilitating symptoms that prevent working-age people from participating fully in life.

Future research using an active control group to establish whether improvements were from the intervention versus other factors is strongly encouraged. Future studies may also consider exploring MBSR as a potential coping mechanism for those living with either SCD or MCI and could build on this dissertation to explore if this could improve overall perceived benefit. Last, from an occupational therapy perspective, future research exploring how mindfulness training contributes to occupational engagement or optimizing the experience of occupation and its implications on function.

There is an increasing trend to support older adults to age-in-place. This dissertation evaluated self-perceived functional performance and satisfaction. Future studies could further build on the functional implications of the affective domain for those experiencing changes in anxiety, as it would benefit an aging population with cognitive decline. Overall, this dissertation suggests that a future full-scale RCT is recommended with minor modifications to the design. Moreover, this dissertation suggests that it is feasible to embed an occupational therapy-led MBSR in an interprofessional primary care setting. Thus, would be a significant evidence-based contribution to the overall care of the aging population to support social and emotional functioning. This dissertation provided the necessary groundwork to inform future multi-method longitudinal RCT studies to further explore functional performance as it is an essential criterion to age-in-place and may contribute to mindfulness, healthy ageing, and occupational therapy within an IPC setting.

Implications and recommendations of the doctoral thesis

This dissertation provides an opportunity to reflect on practice, research and policy implications related to occupational therapists' role in supporting older adults with cognitive decline in an IPC setting.

i. *To build evidence of team-based care approaches for those older adults living with SCD or MCI within an IPC setting*

Future research on cognitive impairment should be situated within an interprofessional primary care setting since it is often the first access point to health care for individuals with memory-related concerns (Knopman & Petersen, 2014). More specifically, focusing on models of team-based care approaches to explore how teams can be utilized to deliver health services improves patients' health outcomes (Donnelly et al., 2019; Haj-Ali et al., 2021). It also meets the complex needs of older adult patients and those with cognitive deficits (Lukewich et al., 2018).

My recommendations for future research are to:

- Evaluate and provide robust evidence-based interventions to support the patient population at risk for cognitive decline
- Provide education and support from an interprofessional approach for the early detection and recognition of cognitive decline within primary care
- Evaluate strategies to support confidence in diagnostic skills among primary care physicians to confirm an SCD or MCI diagnosis
- Examine the cost-effectiveness of interprofessional team-based primary care services provided by occupational therapists within primary care by conducting an economic analysis
- Coordinate with another health delivery service model, such as Home Care to evaluate how best to provide team-based care for those living at home with cognitive decline.

ii. To leverage technological innovation within primary care to support community-dwelling older adults with cognitive decline to age-in-place

There is much room for innovation and improvement to support older adults with cognitive decline through technology use and user-centred design approaches that meet their needs and those of their healthcare providers. Emerging literature from the COVID-19 pandemic has taught us the need for innovation through collaboration between key sectors, such as researchers, developers (e.g., Apps, software), older adults and their family members (Li et al., 2021), to ensure technology fluency among older adult end-users is possible. Because the COVID-19 pandemic accelerated technology use by older adults (Castillo et al., 2021; Li et al., 2021), it would be advantageous to leverage this opportunity to broaden further the scope of technology use among this population in primary care. As older adults use ET for everyday life activities (e.g., online banking, email, videoconferencing, smartphones, computers, etc.) (Hedman et al., 2017), technology is the new iADL. As such, there is an opportunity to strengthen the occupational therapy role in the technology domain as the new iADL.

My recommendations for clinical practice include the following:

- Like any other iADL, it needs to be addressed by occupational therapists in a client-centred approach to adapt to their cognitive, physical and mental abilities
- For health care providers, such as an occupational therapist to manage and monitor an individual's cognitive abilities and appropriately respond by adapting the technology to meet the patient's cognitive needs in a client-centred approach as technology is the new iADL
- To consider being one of the key stakeholders in developing new technology that can be used for future clinical applications such as i). falls detection; ii). home monitoring; iii). improving or supporting function at home; and iv). technology that is able to adapt to the patients' cognitive abilities.

iii. To allocate resources for more FHTs to support older adult strategies within primary care

According to the Public Health Agency of Canada (2016), one in four Canadians will be 65 years and older by 2036. One in five Canadians 65 years and older are currently living with at least one chronic disease. From an aging perspective, evidence is emerging that those living with SCD or MCI have two or more chronic conditions (comorbidities) (Caracciolo et al., 2013; Poblador-Plou et al., 2014). Living with coexisting chronic conditions, including anxiety, may further accelerate cognitive decline and functional impairment (Caracciolo et al., 2013), resulting in higher primary care (Browne et al., 2017) and potential specialist care utilization.

My policy recommendations are to:

- Streamline funding to support more FHTs as currently there are 184 FHTs serving three million Ontarians (College of Family Physicians of Canada, 2019), and by 2036, one in four Canadians will be 65 years and over
- Advocate for senior-friendly policy to ensure older Canadians are not at the periphery but are at the core of primary care and for interprofessional primary care teams where possible
- Have interprofessional primary care team policies that recognize comorbidity as a key factor to address when allocating resources and planning for aging Canadians
- Have a policy in place to give at least 75 percent of Canadians 65 years and over, in particular, those at risk for early cognitive deficits, access to interprofessional primary care teams by 2036 that will focus on prevention, identification, monitoring and management of health-related issues

Limitations of the Doctoral Dissertation

This study has several limitations. First, while the sample size was appropriate for our study aims, a larger sample size is required for a fully powered RCT. However, it could be argued that feasibility pilot trials are not powered to test hypotheses about effectiveness but rather to test the feasibility criteria (Eldridge et al., 2016). This dissertation, as designed, did not achieve the benchmarks that were set. However, with minor modifications to the design, including changing how participants who drop-out are analyzed, extending recruitment, and adding multiple sites, this MBSR program would be well suited to study further using a full-scale RCT.

Second, the lack of an active control group is also a limitation. An active control group may account for improvements caused by factors other than the treatment and would be important to consider (Boot et al., 2013). An MBSR study by Perez et al. (2019) evaluated three treatment groups to support fibromyalgia patients: MBSR, treatment as usual group (TAU) and an active control psychoeducation group. They found that the MBSR group had superior psychological improvements for fibromyalgia patients than TAU and active control (Perez-Aranda et al., 2019). In a future study, an active control cognitive stimulation group using cognitive strategies (e.g., physical activity, memory mnemonics) may be warranted to explore versus a WLC group.

Third, since this study focused on the feasibility of an RCT, future, more extensive studies should focus specifically on participants with SCD or MCI, but not both. Participants with MCI have objective cognitive deficits, whereas persons with SCD do not, which may result in different post-intervention clinical outcomes. In this study, four participants with a confirmed MCI diagnosis were equally distributed in each study group. The remaining participants self-identified as having memory issues without a formal MCI diagnosis. We ruled out dementia by using the MoCA to screen for a score of $\leq$19. It can be hypothesized that the outcomes of participants with only MCI, as their condition is objectively more progressive than SCD, maybe more objectively dramatic (i.e., clinical improvement) at post-intervention than their SCD counterparts. At present, our findings may not be specific to either SCD or MCI and may only be generalizable to those with early cognitive decline or a cluster of participants with a MoCA score of 20 or greater. Therefore, future studies may consider evaluating SCD or MCI participants separately.

Fourth, our participants' sociodemographic characteristics should be considered when interpreting our findings. All 27 participants represented a slightly higher socioeconomic status (SES), with seven participants reporting an income between $51 and $99K and six participants with incomes over $100K, which is consistent with higher income distribution with other FHTs (Glazen et al., 2015). Participants with higher SES in both study groups were professionals (e.g., nurse, vice-principal, teacher, lawyer, etc.), compared to 12 other participants who earned less than $50K. In addition, study participants were self-selected. Thus, suggests that persons of higher SES may be more interested and motivated to engage in primary care research to support their health by performing mindfulness practices and have the work flexibility to participate in research as opposed to participants who may be essential workers. The self-selection behaviour and higher SES also suggest that these participants may be at the higher end of the range of cognitive function abilities compared to the general population as the mean score on the MoCA (MBSR; 25.00) and (WLC; 25.92). Thus, findings may not be generalizable to the general population of older adults with lower socioeconomic status and lower MoCA scores.

Conclusion

Growing evidence from the literature supports the role of occupational therapy in primary care, with a large focus on occupational therapy interventions to support older adults, including those with SCD or MCI, to live and age in their communities. Findings from this dissertation reported no significant improvement in self-perceived performance and satisfaction on the COPM with mindfulness training. However, there was a significant reduction in anxiety post-MBSR. Further, our findings highlighted that MBSR is feasible for practice and provided insights into how the MBSR program may have clinical utility for optimizing the affective domain of functioning, which is crucial to supporting social and emotional functioning. However, a future RCT is recommended with changes to the design such as using an alternative LOCF method, as drop-out significantly impacted our retention and adherence rates. Second, the recruitment period should be extended beyond five months or to offer the MBSR program at multiple primary care sites to achieve a larger sample size and desired recruitment rate. Findings from this dissertation also highlighted the possibility of leveraging future technological innovations in primary care to support community-dwelling older adults with SCD or MCI. As such, there is potential utility for leveraging technology, as demonstrated by the accelerated uptake of older adults using technology based on observations during the COVID-19 pandemic. Taking advantage of the unique opportunity of the pandemic to further evaluate technological innovations to support more aging adult population to age-in-place would be fruitful.

It is hoped that this dissertation will inform future clinical practice and research within the context of primary care and contribute meaningfully to how occupational therapists can thoughtfully engage in a team-based approach to support all aging Canadians to live and age in their communities.

References

Advocat, J., Enticott, J., Vandenberg, B., Hassed, C., Hester, J., & Russell, G. (2016). The effects of a mindfulness-based lifestyle program for adults with Parkinson's disease: a mixed methods, wait list controlled randomised control study. *BMC neurology, 16*(1), 166-166. doi:10.1186/s12883-016-0685-1

Akinci, B., Dayican, D. K., Deveci, F., Inan, C., Kaya, S., Sahin, O., . . . Onursan, Z. (2022). Feasibility and safety of Qigong training delivered from two different digital platforms in physically inactive adults: A pilot randomised controlled study. *European journal of integrative medicine, 54*. doi:10.1016/j.eujim.2022.102171

Alshurafa, M., Briel, M., Akl, E. A., Haines, T., Moayyedi, P., Gentles, S. J., . . . Guyatt, G. H. (2012). Inconsistent definitions for intention-to-treat in relation to missing outcome data: systematic review of the methods literature. *PloS one, 7*(11), e49163-e49163. doi:10.1371/journal.pone.0049163

Alsubaie, M., Dickens, C., Dunn, B. D., Gibson, A., Ukoumunne, O. C., Evans, A., . . . Kuyken, W. (2018). Feasibility and Acceptability of Mindfulness-based Cognitive Therapy Compared with Mindfulness-based Stress Reduction and Treatment as Usual in People with Depression and Cardiovascular Disorders: a Three-Arm Randomised Controlled Trial. *Mindfulness, 11*(1), 30-50. doi:10.1007/s12671-018-0999-8

Bains, C. (2020). Daughter of man at care home hit by COVID-19 says loneliness is a big issue *Vancouver Sun*.

Beard, J. R., Officer, A. M., & Cassels, A. K. (2016). The world report on ageing and health. *The Gerontologist, 56*(Suppl 2), S163-S166. doi:10.1093/geront/gnw037

Beaudreau, S. A. P. D., & O'Hara, R. P. D. (2008). Late-Life Anxiety and Cognitive Impairment: A Review. *The American Journal of Geriatric Psychiatry, 16*(10), 790-803. doi:10.1097/JGP.0b013e31817945c3

Belchior, P., Korner-Bitensky, N., Holmes, M., & Robert, A. (2015). Identification and assessment of functional performance in mild cognitive impairment: A survey of occupational therapy practices. *Australian Occupational Therapy Journal, 62*(3), 187-196. doi:10.1111/1440-1630.12201

Berry, J. M., West, R. L., Dennehey, D. M. (1989). Reliability and Validity of the Memory Self-Efficacy Questionnaire. *Developmental psychology*, *25*(5), 701–713. https://doi.org/10.1037/0012-1649.25.5.701.

Boot, W. R., Simons, D. J., Stothart, C., & Stutts, C. (2013). The Pervasive Problem With Placebos in Psychology: Why Active Control Groups Are Not Sufficient to Rule Out Placebo Effects. *Perspect Psychol Sci, 8*(4), 445-454. doi:10.1177/1745691613491271

Bradford, A., Kunik, M. E., Schulz, P., Williams, S. P., & Singh, H. (2009). Missed and delayed diagnosis of dementia in primary care: prevalence and contributing factors. *Alzheimer disease and associated disorders, 23*(4), 306-314. doi:10.1097/WAD.0b013e3181a6bebc

Browne, J., Edwards, D. A., Rhodes, K. M., Brimicombe, D. J., & Payne, R. A. (2017). Association of comorbidity and health service usage among patients with dementia in the UK: a population-based study. *BMJ Open, 7*(3), e012546-e012546. doi:10.1136/bmjopen-2016-012546

Caracciolo, B., Gatz, M., Xu, W., Marengoni, A., Pedersen, N. L., & Fratiglioni, L. (2013). Relationship of subjective cognitive impairment and cognitive impairment no dementia to chronic disease and multimorbidity in a nation-wide twin study. *Journal of Alzheimer's Disease, 36*(2), 275-284. doi:10.3233/JAD-122050

Castillo, J. M. C., Garcia, L. L., Abalos, E., & Locsin, R. C. (2021). Living alone and using social media technologies: The experience of Filipino older adults during the COVID-19 pandemic. *Nurs Inq*, e12460. doi:10.1111/nin.12460

Chu, C. H., Donato-Woodger, S., & Dainton, C. J. (2020). Competing crises: COVID-19 countermeasures and social isolation among older adults in long-term care. *J Adv Nurs, 76*(10), 2456-2459. doi:10.1111/jan.14467

Cole, M. B., & Tufano, R. (2008). *Applied theories in occupational therapy: a practical approach*. Thorofare, N.J: SLACK Inc.

College of Family Physicians of Canada. (2019). *A New Vision for Canada: Family Practice - The Patient's Medical Home*. Retrieved from The College of Physicians of Canada:

Connolly, A., Gaehl, E., Martin, H., Morris, J., & Purandare, N. (2011). Underdiagnosis of dementia in primary care: Variations in the observed prevalence and comparisons to the expected prevalence. *Aging & Mental Health, 15*(8), 978-984. doi:10.1080/13607863.2011.596805

Crook, T. H., Feher, E. P., Larrabee, G. J. (1992). Assessment of Memory Complaint in Age-Associated Memory Impairment: The MAC-Q. *International psychogeriatrics*, *4*(2), 165–176. https://doi.org/10.1017/S1041610292000991.

Donnelly, Leclair, L. L., Hand, C., Wener, P. F., & Letts, L. J. (2022). *Occupational therapy and primary care: a vision for the path forward*. Retrieved from

Donnelly, C., Ashcroft, R., Mofina, A., Bobbette, N., & Mulder, C. (2019). Measuring the performance of interprofessional primary health care teams: understanding the teams perspective. *Prim Health Care Res Dev, 20*, e125. doi:10.1017/S1463423619000409

Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A. (2016). CONSORT 2010 statement: extension to randomised pilot and feasibility trials. *BMJ, 355*, i5239. doi:10.1136/bmj.i5239

Elliot, M. L. (2011). Being Mindful about Mindfulness: An Invitation to Extend Occupational Engagement into the Growing Mindfulness Discourse. *Journal of occupational science, 18*(4), 366-376. doi:10.1080/14427591.2011.610777

Gettel, C. J., Chen, K., & Goldberg, E. M. (2021). Dementia Care, Fall Detection, and Ambient-Assisted Living Technologies Help Older Adults Age in Place: A Scoping Review. *J Appl Gerontol, 40*(12), 1893-1902. doi:10.1177/07334648211005868

Glazier, R.H., Hutchison, B., Kopp, A. (2015). *Comparison of Family Health Teams to Other Ontario Primary Care Models, 2004/05 to 2011/12*. Toronto: Institute for Clinical Evaluative Sciences.

Goodman, V., Wardrope, B., Myers, S., Cohen, S., McCorquodale, L., Kinsella, E. A. (2019). Mindfulness and Human Occupation: A Scoping Review. *Scandinavian journal of occupational therapy, 26*(3), 157–170. doi.org/10.1080/11038128.2018.1483422

Grabovac, A. D., Lau, M. A., & Willett, B. R. (2011). Mechanisms of Mindfulness: A Buddhist Psychological Model. *Mindfulness, 2*(3), 154-166. doi:10.1007/s12671-011-0054-5

Guerrera, F., Renaud, S., Tabbò, F., Filosso, P. L. (2017). How to Design a Randomized Clinical Trial: Tips and Tricks for Conduct a Successful Study in Thoracic Disease Domain. *Journal of thoracic disease, 9*(8), 2692–2696. https://doi.org/10.21037/jtd.2017.06.147.

Gupta, S. K. (2011). Intention-to-treat concept: A review. *Perspectives in clinical research, 2*(3), 109-112. doi:10.4103/2229-3485.83221

Haj-Ali, W., Hutchison, B., Moineddin, R., Wodchis, W. P., & Glazier, R. H. (2021). Comparing primary care Interprofessional and non-interprofessional teams on access to care and health services utilization in Ontario, Canada: a retrospective cohort study. *BMC Health Serv Res, 21*(1), 963. doi:10.1186/s12913-021-06595-x

Hedman, A., Kottorp, A., & Nygård, L. (2018). Patterns of everyday technology use and activity involvement in mild cognitive impairment: a five-year follow-up study. *Aging & Mental Health, 22*(5), 603-610. doi:10.1080/13607863.2017.1297361

Hedman, A., Lindqvist, E., & Nygård, L. (2016). How older adults with mild cognitive impairment relate to technology as part of present and future everyday life: a qualitative study. *BMC geriatrics, 16*(1), 73-73. doi:10.1186/s12877-016-0245-y

Hedman, A., Nygård, L., & Kottorp, A. (2017). Everyday Technology Use Related to Activity Involvement Among People in Cognitive Decline. *The American journal of occupational therapy, 71*(5), 7105190040p7105190041-7105190040p7105190048. doi:10.5014/ajot.2017.027003

Hoffman, L., Hutt, R., Yi Tsui, C. K., Zorokong, K., & Marfeo, E. (2020). Meditation-Based Interventions for Adults With Dementia: A Scoping Review. *The American journal of occupational therapy : official publication of the American Occupational Therapy Association, 74*(3), 7403205010p7403205011-7403205010p7403205014. doi:https://dx.doi.org/10.5014/ajot.2020.037820

Hutchison, B., Levesque, J.-F., Strumpf, E., & Coyle, N. (2011). Primary Health Care in Canada: Systems in Motion. *The Milbank Quarterly, 89*(2), 256-288. doi:10.1111/j.1468-0009.2011.00628.x

Jessen, F., Amariglio, R. E., Buckley, R. F., van der Flier, W. M., Han, Y., Molinuevo, J. L., Rabin, L., Rentz, D. M., Rodriguez-Gomez, O., Saykin, A. J., Sikkes, S. A. M., Smart, C. M.; Wolfsgruber, S., Wagner, M. (2020). The Characterisation of Subjective Cognitive Decline. *Lancet neurology, 19*(3), 271–278. https://doi.org/10.1016/S1474-4422(19)30368-0.

Juul, L., Pallesen, K. J., Bjerggaard, M., Nielsen, C., & Fjorback, L. O. (2020). A pilot randomised trial comparing a mindfulness-based stress reduction course, a locally-developed stress reduction intervention and a waiting list control group in a real-life municipal health care setting. *BMC public health, 20*(1), 409-409. doi:10.1186/s12889-020-08470-6

Klein, D. (Producer). (2020). How social distancing for coronavirus could cause a loneliness epidemic.

Knopman, D. S., & Petersen, R. C. (2014). Mild cognitive impairment and mild dementia: a clinical perspective. *Mayo Clinic proceedings, 89*(10), 1452-1459. doi:10.1016/j.mayocp.2014.06.019

Kruse, R. L., Alper, B. S., Reust, C., Stevermer, J. J., Shannon, S., & Williams, R. H. (2002). Intention-to-treat analysis: who is in? Who is out? *The Journal of family practice, 51*(11), 969-971.

Lee, L., Hillier, L. M., Heckman, G., & Gagnon, M. (2014). Primary Care-Based Memory Clinics: Expanding Capacity for Dementia Care. *Canadian Journal on Aging, 33*(3), 307-319. doi:10.1017/S0714980814000233

Lee, L., Hillier, L. M., Stolee, P., Heckman, G., Gagnon, M., McAiney, C. A., & Harvey, D. (2010). Enhancing dementia care: a primary care-based memory clinic. *Journal of the American Geriatrics Society, 58*(11), 2197-2204. doi:10.1111/j.1532-5415.2010.03130.x

Li, S. Y. H., & Bressington, D. (2019). The effects of mindfulness-based stress reduction on depression, anxiety, and stress in older adults: A systematic review and meta-analysis. *International journal of mental health nursing, 28*(3), 635-656. doi:10.1111/inm.12568

Li, W., Ornstein, K. A., Li, Y., & Liu, B. (2021). Barriers to learning a new technology to go online among older adults during the COVID-19 pandemic. *Journal of the American Geriatrics Society (JAGS), 69*(11), 3051-3057. doi:10.1111/jgs.17433

Li, X. X., & Li, Z. (2018). The impact of anxiety on the progression of mild cognitive impairment to dementia in Chinese and English data bases: a systematic review and meta-analysis. *International Journal of Geriatric Psychiatry, 33*(1), 131-140. doi:10.1002/gps.4694

Lukewich, J., Edge, D. S., VanDenKerkhof, E., Williamson, T., & Tranmer, J. (2018). Team composition and chronic disease management within primary healthcare practices in eastern Ontario: an application of the Measuring Organizational Attributes of Primary Health Care Survey. *Prim Health Care Res Dev, 19*(6), 622-628. doi:10.1017/S1463423618000257

Mahlo, L., & Windsor, T. D. (2021). Feasibility, Acceptability, and Preliminary Efficacy of an App-Based Mindfulness-Meditation Program Among Older Adults. *Gerontologist, 61*(5), 775-786. doi:10.1093/geront/gnaa093

McDonough, I. M., McDougall, G. J., LaRocca, M., Dalmida, S. G., Arheart, K. L. (2020). Refining the Metamemory in Adulthood Questionnaire: a 20-Item Version of Change and

Capacity Designed for Research and Clinical Settings. *Aging & mental health*, *24*(7), 1054–1063. https://doi.org/10.1080/13607863.2019.1594160.

Nagaoka, M., Hashimoto, Z., Takeuchi, H., & Sado, M. (2021). Effectiveness of mindfulness-based interventions for people with dementia and mild cognitive impairment: A meta-analysis and implications for future research. *PloS one*, *16*(8), e0255128. doi:https://dx.doi.org/10.1371/journal.pone.0255128

Parmar, J. D., B.; Marin, A.; Kirwan, C.; McKay, R. . (2012). Development of a Multidisciplinary Model of Dementia Care for Use in Primary Care Networks in Alberta. *Alzheimer's & dementia, 8*(4).

Pashmdarfard, M., Azad, A. (2020). Assessment Tools to Evaluate Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) in Older Adults: A Systematic Review. *Medical journal of the Islamic Republic of Iran*. https://doi.org/10.47176/mjiri.34.33.

Pati S, Chauhan AS, Mahapatra S, Sinha R, Pati S. Practicing health promotion in primary care - a reflective enquiry. J Prev Med Hyg. 2017 Dec 30;58(4):E288-E293. doi: 10.15167/2421-4248/jpmh2017.58.4.749. PMID: 29707659; PMCID: PMC5912790.Patomella, A.-H., Lovarini, M., Lindqvist, E., Kottorp, A., & Nygård, L. (2018). Technology use to improve everyday occupations in older persons with mild dementia or mild cognitive impairment: A scoping review. *British Journal of Occupational Therapy*, 81(10), 555-565. doi:10.1177/0308022618771533

Perez-Aranda, A., Feliu-Soler, A., Montero-Marin, J., Garcia-Campayo, J., Andres-Rodriguez, L., Borras, X., . . . Luciano, J. V. (2019). A randomised controlled efficacy trial of mindfulness-based stress reduction compared with an active control group and usual care for fibromyalgia: the EUDAIMON study. *Pain, 160*(11), 2508-2523. doi:10.1097/j.pain.0000000000001655

Poblador-Plou, B., Calderón-Larrañaga, A., Marta-Moreno, J., Hancco-Saavedra, J., Sicras-Mainar, A., Soljak, M., & Prados-Torres, A. (2014). Comorbidity of dementia: a cross-sectional study of primary care older patients. *BMC psychiatry, 14*(1), 84-84. doi:10.1186/1471-244X-14-84

Rowe, J. W., & Kahn, R. L. (1997). Successful aging. *The Gerontologist, 37*(4), 433-440. doi:10.1093/geront/37.4.433

Smart, C. M., Segalowitz, S. J., Mulligan, B. P., Koudys, J., & Gawryluk, J. R. (2016). Mindfulness Training for Older Adults with Subjective Cognitive Decline: Results from a Pilot Randomised Controlled Trial. *Journal of Alzheimer's disease, 52*(2), 757.

Shim, M., Tilley, J. L., Im, S., Price, K., & Gonzalez, A. (2021). A Systematic Review of Mindfulness-Based Interventions for Patients with Mild Cognitive Impairment or Dementia and Caregivers. *Journal of geriatric psychiatry and neurology, 34*(6), 528-554. doi:https://dx.doi.org/10.1177/0891988720957104

Smith-Turchyn, J., Richardson, J., Tozer, R., McNeely, M., & Thabane, L. (2020). Bridging the gap: incorporating exercise evidence into clinical practice in breast cancer care. *Supportive Care in Cancer, 28*(2), 897-905. doi:10.1007/s00520-019-04897-9

Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of Primary Care to Health Systems and Health. *The Milbank Quarterly, 83*(3), 457-502. doi:10.1111/j.1468-0009.2005.00409.x

Streiner, D. L. (2014). Statistics Commentary Series Commentary #3-Last Observation Carried Forward. *Journal of clinical psychopharmacology, 34*(4), 423-425. doi:10.1097/JCP.0000000000000155

Townsend, E. (2002). *Enabling occupation: an occupational therapy perspective* (Rev. ed. ed.). Ottawa: Canadian Association of Occupational Therapists.

Townsend, E. A., & Polatajko, H. J. (2013). *Enabling occupation II : advancing an occupational therapy vision for health, well-being and justice through occupation*. Ottawa: Canadian Association of Occupational Therapists.

Tse, S., Penman, M., & Simms, G. (2003). Literature review: Primary care and occupational therapy. *New Zealand Journal of Occupational Therapy*, 50, 17-23.

Wagner, Edward H., et al. “Organizing Care for Patients with Chronic Illness.” The Milbank Quarterly, vol. 74, no. 4, 1996, pp. 511–44. JSTOR, https://doi.org/10.2307/3350391.

Wilcock, A. A. (2006). An occupational perspective of health. SLACK Inc.

Wilcock, A. A., & Hocking, C. (2015). *An occupational perspective of health* (Third edition. ed.). Thorofare, NJ: SLACK Incorporated.

Wong, W. P., Coles, J., Chambers, R., Wu, D. B.-C., & Hassed, C. (2017). The Effects of Mindfulness on Older Adults with Mild Cognitive Impairment. *JAD reports, 1*(1), 181-193. doi:10.3233/ADR-170031

APPENDICES

Appendix A: Informed Consent Form for Participants

Consent Form to Participate in a Research Study

Study Title: 8-Week Mindfulness-Based Stress Reduction (MBSR) Program

Principal Investigator: Todd Tran (PhD Student), OT Reg (Ont) and Dr. Catherine Donnelly

Funder: Canadian Centre for Brain Aging and Health Innovation

---

Consent

This consent form will give you information in order for you make an informed decision to participate in this research study or not. You do not have to decide today whether or not you will participate in the study. Before you decide, you can talk to anyone you feel comfortable with about the research.

The informed decision is a voluntary agreement to participate in this research study. It is not merely a form that is signed but is a process, in which you will have an understanding of the research and its risks described below before agreeing (or not) to participate.

Please ask me to stop as we go through the information if you have any questions and I will take time to explain. If you have questions later, you can ask them of me and also the research associates throughout the research study to answer any of your questions as well. Please take as much time as you need in order to understand and to read through this document in order to make an informed decision to participate (or not) in this research study.

Introduction

I am the Principal Investigator and also a PhD student at Queen's University in the school of Rehabilitation Therapy; Aging and Health Stream and this study is part of my program. You are invited to participate in a research study, an 8-Week Mindfulness-Based Stress Reduction (MBSR) Program for older adults 60+ years and older living with subjective cognitive decline (SCD) or with mild cognitive impairments (MCIs) at Women's College Hospital (WCH), Family Health Centre in partnership with Queen's University. We are looking for a small number of 30 to 40 participants to be involved in this study.

For ease of understanding, the term **mindfulness** is defined as:

"Paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally"
"Bringing one's complete attention to the present experience on a moment-to-moment basis"

What is the purpose of this research study?
The aim of this study is to look at the feasibility of carrying out a mindfulness program that may benefit older adults 60+ years and older living with mild memory issues, on a Family Health Team. First, the study will assess feasibility outcomes (e.g. participant's experiences, use of technology and acceptability with the overall experience in the MBSR program). Second, studies in the past 25 years have seen that MBSR can be used to reduce anxiety, low mood, perceived stress along with enhancing emotional well-being and quality-of-life. Thus, this study is to see if MBSR can be used to help with emotional well-being for those living with SCD or MCI to cope with memory problems. Third, the study will also look at how MBSR may influence your perceived satisfaction on functional performance on every-day tasks. Lastly, if you agree to participate, you will be asked to be part of a focus group (at around Week 12) to explore your experience of being in the MBSR program. We will ask you questions around your overall experience within the program (e.g. satisfaction, value, barriers and facilitators). Closer to the date, we will ask you again for your informed consent to participate in this focus group. You do not have to decide now, but you will get an opportunity to decide in the future between Week-6 and Week-12. We will contact you again at that point in time.

What will happen in this study?
If you decide to participate, you will be enrolled in an 8-Week MBSR Program (with a follow-up session four weeks after participating in the program). We will randomly assign the groups to you, to either Group 1 (to start within a few weeks) or Group 2 (at a future date). The group you are assigned to will not be known, until you consent to the study. Unfortunately, you will not be able to choose your group. However, it is important to note that, regardless of your group allocation, we will be asking you to complete some questionnaires at different time points. If you are assigned to Group 1, we will also ask you to participate in a focus group at the end of the program that will consist of 1.5 hour in duration. Group 1 participants will be invited to an audio-recorded focus group, facilitated by an assessor that is not part of the study. The purpose of the focus group is to get feedback about participant's overall experience within the group. Group 2 will not be involved in a focus group.

The MBSR program is provided to a group of older adults 60+ years and older with mild memory issues and will consist of mindfulness practices including: sitting and lying down meditations, gentle mindful movement (yoga)), learning about mindful eating, and mindful everyday routines.

The research team would like to access your medical chart at WCH for purposes of research to confirm only the following: your health history, co-morbidities and medications. You have the option to opt out of this if you would like:

- ☐ Yes, I consent to allow the research team to have access to my medical records at WCH

- ☐ No, I do not wish the research team to have access to my medical records at WCH

You will also be provided with a study mini-iPad (if you do not have one of your own), and you are able to keep it during the study timeframe only (for the duration of the study). All mini-iPads will have an identification sticker attached and will correspond with your participant ID number.

Clear instructions will be given on the care (i.e., charging it, taking care of the device) throughout the sessions. However, if the device becomes damaged, loss, stolen (beyond your control), you are not responsible for replacing it. However, based on the number of participants and iPads, if available we would provide you with a replacement iPad. It will be understood at the end of the study, the iPads must be returned.
As part of the research, you will be required to complete some surveys (pencil and paper questionnaires) initially during the Intake Assessment session at Week 1, again at the end of the program at Week 8, and the follow-up session at Week 12, which we will hold ~ 1 month after completion of the MBSR course.

The screening session will be approximately 60 minutes in length to make sure you are eligible for the study. The screening session will entail completing a cognitive screen, and a depression scale. If your score is not within the criteria of the study, you will not be considered eligible. However, if you are not eligible, we will give you some community resources, or you may also follow-up with your family physician, to talk to them about your score(s).

All the data that we collect from you over the sessions will be kept strictly confidential and will **not** be added to your medical chart.

Length of Study
Excluding the session of pre-screening for eligibility, the length of the study will be **11 sessions**, consisting of: i. Orientation (3 hours), ii. The 8-week MBSR program (3 hours per week), iii. An all-day Saturday retreat (6 hours), and iv. A follow-up session held about 1 month after the program (1.5 hours – focus group) and post-surveys. Approximately, a three-month commitment.

The weekly sessions will be as follows:

- They will be held on Thursday afternoons from 1:30 pm to 4:30. You are able to take a break at any time during the sessions and accessible washrooms are close by.
- There will be an initial intake and screening session (if you are deemed to be eligible), and the program will then run for 8-Weeks with (an all-day Saturday session) and one follow-up session at Week 12 (four weeks after the completion of the program).
- A copy of the 8-Week program agenda is also attached to this form for you to read
- We are hoping that the group will be made up of anywhere from 15-20 participants, all genders
- We will be asking you to provide some information on the following topics as part of completing the pencil and paper questionnaires: anxiety and mood rating scales along with quality-of-life measures and questions around your basic day-to-day activities that you do routinely around your home and outside of your home
- You will be given a mini iPad to borrow for the duration of the study to use (to play audio files for mindfulness practices)

What are the possible harms of taking part in this study?

To participate in the study, you must be under the care of a physician, and you will be asked to provide us with an emergency contact for us to contact in case of emergency.

Name of Emergency Contact: ________________________________

Relationship: ____

There may be unforeseeable harms that may arise, you may have a short or long-term concerns that may interfere with your ability to participate and be involved in the program. The study requires an investment of your time as it will be a 3-month commitment, if assigned either into Group 1 (in a few weeks) **or** Group 2 (at a future date). Some questions may make you feel upset or distressed but, you can opt out, take a break or discontinue participation for any reason whenever you feel the need to. If you experience any emotional distress, we will connect you with a social worker on the Family Health Team (FHT).

If you experience any difficulties, challenges or ability to follow and keep up with the pace during the 8-Week Program, there will be staff that may be able to assist and support you as there is a team of occupational therapists involved in this research study.

- Staff members or Research Assistant (RA) will give you reminder phone calls for each session if you provide consent for us to do so, and if you're unable to come to any of the session(s), a follow-up phone call will be provided to give you the homework, and to inform you of what was missed. Again, this will only be done if you provide consent for us to phone you (see page 6 for consent).

- Technical support on using the mini-iPad will be provided on-site during the weekly sessions

- Staff will answer any of your questions and address any of your concerns along the way

- We will establish group norms, e.g., making sure that we abide by WCH scent-free policy, keeping whatever is discussed within the group is kept private and confidential thus, creating a safe environment for participants to feel free to speak and share their experiences. We also encourage people to get up and move around if they need to, allowing for people to take breaks when they need to, etc.

- We will provide support and accommodation(s) to you for any of the activities, e.g., supporting people to lie down, sit and/or stand if they chose based on their health condition, throughout the study.

What are the possible benefits of participating in this study?
As a participant, you may or may not experience any benefits as every participant is different. There is no guarantee that the intervention will have an effect. However, research has shown that some people who practice mindfulness experience improvements in anxiety, mood, perceived stress, emotional well-being and quality-of-life. This is why we are doing the research – in order to determine if there is a potential benefit for those living with cognitive impairments.

What happens if I decide not to take part in this research study?

Your participation in this study is completely voluntary.
Your decision to take part or not in this research study will not have an impact on your medical care. You will continue to have the same access of routine care you are currently receiving now.

Do I have the right to withdraw?
You can withdraw from this study at any time by contacting the Principal Investigator (Todd Tran). If you withdraw your participation, your data provided to date may still be used as part of the study. And we will collect your iPad.

Compensation
You will be provided with a $5 Metro Gift Card at each session. The gift card is given at each session by a staff member and your signature is be required.

Confidentiality
We respect your privacy and will do our outmost to keep all information about yourself collected or obtained confidential. Only the research team members will have access to this information. The research study staff, the WCH Research Ethics Board, Queen's committee members and employees of the sponsor or funder of the study may look at your personal information only for purposes related with this study. The research team and those mentioned are the only people authorized to view your research data only under the supervision of the Principal Investigator and will be obligated to protect your privacy and not disclose your personal information. None of your personal information will be made public unless necessary by the law. If the research results are published, your identity will remain confidential. The risk of identifying you from the study data is negligible, however it can never be completely eliminated. The study data will be kept in a secure location for ten years, then destroyed.

It is important to note that as staff members, we are very serious about confidentiality, however, we cannot guarantee that other participants in the group will maintain confidentiality (if you were to discuss anything in a group or one-on-one to other participants). We will, however, convey the importance of maintaining confidentiality throughout the 8-Week program as this is something we would request from all participants in the study.

If I have questions or problems, whom should I contact?
If you have any questions, please feel free to contact the PI:

Todd Tran PhD (cand), MScCH, OT Reg (Ont),
Occupational Therapist in Family Practice and Foot Care Centre
416-323-6525
Todd.Tran@wchospital.ca

If you have questions or concerns about your experience as a research participant, you can contact the Chair of the Research Ethics Board at Women's College Hospital, Dr. Nancy Walton, at 416-351-3732, extension 2325. The Research Ethics Board are a group of people who are not involved in this study and who have ethical oversight of research activities.

Participant

Participant/Substitute decision-maker
By signing this form, I confirm that:

- This research study has been fully explained to me and all of my questions answered to my satisfaction
- I understand the requirements of participating in this research study
- I have been informed of the risks and benefits, if any, of participating in this research study
- I have been informed of any alternatives to participating in this research study
- I have been informed of the rights of research participants
- I have read each page of this form
- I authorize access to my personal health information, medical record (if applicable), and research study data as explained in this form
- I have agreed to participate in this study or agree to allow the person I am responsible for to participate in this study
- (If applicable) I understand that my family doctor will be informed of my participation in this research study
- (if applicable) This informed consent document will be placed in my medical records

☐ I have consent to participating in this study

____

Name of participant/ (Print)	Signature	Date

Person obtaining consent

By signing this form, I confirm that:

- This study and its purpose has been explained to the participant named above
- All questions asked by the participant have been answered
- I will give a copy of this signed and dated document to the participant

____

Name of Person obtaining Consent (print)	Signature	Date

I acknowledge my responsibility for the care and well-being of the above participant, to respect the rights and wishes of the participant as described in this informed consent document, and to conduct this study according to all applicable laws, regulations and guidelines relating to the ethical and legal conduct of research.

Name: ______________________________________

Signature: ____________________________________

Date: ______________________________________

Please indicate if you give consent for us to contact you by phone (for reminder calls or to provide you with the homework if you were to missed a class), and for us to leave a voicemail or/and email as another way to communicate with you

- ☐ Yes, I consent to allow the research team to call me if necessary and to leave a voicemail and/or contact me by e-mail

Phone number: _(   )_____________________   E-mail: __________________________

- ☐ No, I do not consent the research team to phone or e-mail me for the duration of the study

Confirming Consent for Focus Group – (between Week-6 to Week-12)

- ☐ I consent to participate in a focus group
- ☐ No, I do not consent to participate in a focus group

Name of participant (Print)	Signature	Date

Person obtaining consent
By signing this form, I confirm that:

- This study and its purpose has been explained to the participant named above
- All questions asked by the participant have been answered
- I will give a copy of this signed and dated document to the participant

Name of Person obtaining Consent (print)	Signature	Date

Our 8-Week Mindfulness-Based Stress Reduction MBSR Program will be as follows:

77 Grenville St.
Family Practice: Room 202
3.0 hours in duration (with a break)
There will always be staff members at each session

Agenda:

Week 1
Week one session consists of introductions in dyads, establishing group norms for the group and also doing insightful guided meditation practice. Formal practices for the session included: Mindful eating will be introduced along with a guided lying down Body scan. An inquiry was around participant's experiences of the practice and what they noticed in terms of thoughts, feelings and sensations. Homework practices were provided – doing the Body scan 6 days out of the week, reading the Upstream and Downstream fable, eating one meal mindfully, and doing the nine-dot exercise.

Week 2
Formal practices for the Week 2 will consist of: mindful standing movement along with a formal practice of the body scan. Inquiry was around participants' experiences of the practice and what they noticed in terms of thoughts, feelings and sensations. Homework will be taken and discussed around doing the body scan at home, mindful eating, and their interpretation of the Upstream and Downstream Fable and the nine-dot exercise. Insightful discussion was brought forth by the majority of the participants in the group. The formal practice of attention on the breath (AOB) will be also introduced along with homework practice for next week (e.g., pleasant event calendar, body scan, mindful routine activity and AOB).

Week 3
Formal practices for week-3 will consist of: sitting practice of Attention on the Breath (AOB), along with a formal practice of lying down yoga and with a short body scan. An inquiry was around participants' experiences of the practice and what they noticed in terms of thoughts, feelings and sensations. Homework will be taken and discussed regarding the body scan at home, and a pleasant event calendar. Insightful discussion was brought forth by the majority of the participants in the group. Home practice for next week consists of (e.g., unpleasant event calendar, alternating body scan with mindful lying down movement, and self-guided AOB for 5 to 10 mins).

Week 4
Week four sessions will consist of the following formal practices: standing yoga, with a short 20 mins guided meditation practice. Inquiry was around participant's experiences of the practice and what they noticed in terms of thoughts, feelings sensations first in dyads, then in a large group, and with taking up the homework. We will take up unpleasant event calendar and facilitator did an interactive stress reactivity presentation. Homework practices will be provided – alternating the Body scan with standing mindful movement 6 days out of the week and observing stress reactions by noticing (thoughts, moods and behaviours).

Week 5
Week 5 session will consist of the following formal practices: mindful movement and sitting practice, with a practice inquiry. The facilitator will ask participants to reflect on the first half of the program with reflective questions as an invitation to recommit to practice for the remainder

of the program. Stress reaction versus response was presented in class along with noticing habits and changing response i.e. cow path. The facilitator will introduce S.T.O.P. as a responsive strategy. We will end in a short practice and poem.

Week 6
Week six sessions will consist of the following formal practices: 40 mins of sitting meditation, with a practice inquiry. Inquiry was around events of reaction versus responding with mindfulness and creativity etc. In dyads, people will discuss stressful communication, and in large group took up the homework and discussed intention to cultivate awareness, exploring patterns of communication, and noticing habitual patterns and behaviours (not only in the realm of interpersonal communication but also in one's inner life). The facilitator will enact Aikido of styles of communications (aggression, passive, conflict and assertiveness). We will discuss new ways of experimenting with "new behaviours" and ways of engaging interpersonally. We will end on a short practice and poem.

MBSR All Day Class Agenda
Welcome, guidelines for the day: silence, no eye contact, self-care, availability of teachers etc.
Sitting Meditation: focus on awareness of breathing
Guided Yoga, with an option of ending with a short body scan
Slow walking meditation: with introductory guidance
Sitting Meditation: less guidance, more silence
Brief talk, teaching story, poem, drawing out theme such as mindfulness skills across multiple situations in life, cultivating a sense of presence from moment-to-moment, and being open to any experience, whether evaluated as pleasant, unpleasant, or neutral, as an opportunity to practice mindful attention
Lunch instructions - Silent Lunch, mindful walking, self-care
Mountain or Lake Meditation
Slow/fast walking exercise with specific verbal guidance – repeated instructions for noticing, in movement and stillness, various mind-body experiences. Emphasize options for meeting needs as they arise, and the possibility for moving in and out of the exercise
Loving Kindness meditation, ending in stillness
Optional ending practices
Short sittings alternated with short walking, sitting anywhere when change occurs
Mindful walking, gazing out window, stopping and noticing one thing, followed by an open awareness meditation
Dissolving the silence by whispering in pairs
Group Discussion and Dialogue
Closing ceremony

Week 7
Week seven-session will consist of the following formal practices: 30 mins of mindful movement of yoga choices, and sitting practice with a practice inquiry. An inquiry was around mindful awareness that can change the relationship to stress and increase choice along with integrating mindfulness more fully into our lives can increase resilience. Different Chair exercises were introduced and discussion of attachment or aversion, habitual patterns and beginner's mind. After the break, a discussion will be around consumption and developing healthier patterns. We will end in a short practice and poem.

Week 8
Week eight-session will consist of formal practices which will include: Reflective practice of the past eight weeks and what they will learn, the cost or sacrifice made to attend this course and a body scan along with inquiry was around participant's experiences of the practice and what they noticed in terms of thoughts, feelings and sensations. Participants with written and verbal consent will participate in a focus group. A closing ceremony will include the yarn bracelet and also giving participants the certificates for course completion.

1-Month Follow-Up (Evaluation and Focus-Group, if agreeable to participate)

Appendix B: Informed Consent Form for Clinicians

Consent for Focus Group (Clinicians)

Study Title: 8-Week Mindfulness-Based Stress Reduction (MBSR) Program

Principal Investigator: Todd Tran (PhD Student), Catherine Donnelly PhD (Supervisor)

Funder: Canadian Centre for Brain Aging and Health Innovation

---

Consent

This consent form will give you information in order for you to make an informed decision to participate in this study and in a focus group or not, which will occur at a later date of the study, at approximately week 12 (four weeks after the delivery of the 8-Week program). You do not have to decide today whether or not you will participate in the study. However, in terms of participation in the focus group, I will reconfirm with you again, to obtain consent once a date for the focus group has been set (based on everyone's availability to participate). Informed consent is an important process in order for you to decide to participate in this study. The process will involve explaining why the research is being done, what is the purpose of the study, and what is required of your participation, the risks and benefits from participating in the study, and that you have the right to leave at any time without any penalty, if you choose to withdraw from the study.

The informed decision is a voluntary agreement to participate in this study (and in the focus group). It is not merely a form that is signed but is a process, in which you will have an understanding of the research and its risks described below before agreeing (or not) to participate.

Please ask me to stop as we go through the information if you have any questions and I will take time to explain. It you have questions later, you can ask them of me as the Principal Investigator (PI), Todd Tran (TT). Please take as much time as you need in order to understand and to read through this document in order to make an informed decision to participate (or not) in this research study.

Introduction

I am the Principal Investigator (PI) and also a PhD student at Queen's University in the School of Rehabilitation Therapy; Aging and Health Stream and this study is part of my program. You are invited to participate as clinicians running this 8-Week Mindfulness-Based Stress Reduction (MBSR) for older adults 60+ years and older living with subjective cognitive decline (SCD) or mild cognitive impairments (MCIs) at Women's College Hospital (WCH), Family Health Team (FHT), in partnership with Queen's University. I am interested in having clinicians participating in a focus group 60 to 90 mins), after being involved with delivering the 8-Week MBSR program to provide information around your overall experience (e.g. satisfaction, value, barriers, facilitators, etc.) within a primary care context.

What is the purpose of this research study?
The aim of this study is to look at the feasibility of carrying out a mindfulness program that may benefit older adults 60+ years and older living with mild memory issues, on a FHT. First, the study will assess feasibility outcomes (e.g. participant's experiences, use of technology and acceptability with the overall experience in the MBSR program). Second, studies in the past 25 years have seen that MBSR can be used to reduce anxiety, low mood, perceived stress along with enhancing emotional well-being and quality-of-life. Thus, this study is to see if MBSR can be used to help with emotional well-being for those living with SCD or MCI to cope with memory problems. Third, the study will also look at how MBSR may influence participant's perceived satisfaction on functional performance on every-day tasks. Lastly, if you agree to participate, you will also be asked to be part of a focus group to explore your experience of delivering the 8-Week MBSR program.

What will happen in this study?
If you decide to participate, you will be involved with assisting in implementing the 8-Week MBSR program for older adults (Group 1) in the late Spring of 2019. Group 2 will be carried out by PI (TT) which is the control group at a later date in 2019. However, after running Group 1, at Time 3 (12-Week), if you agree to participate, you will also be asked to be part of a focus group which will be 1.5 hour in duration and will be audio-recorded, facilitated by an independent assessor that is not part of the study.

In implementing and delivering the group, the weekly sessions will be as follows:

- They will be held on Thursday afternoons from 1:30 pm to 4:30 with a 15-minute break.

- The program will run for 8-Weeks sessions (with an all-day Saturday retreat session – approximately from 9:30 to 3:30 but will be based on clinician's availability and either on the scheduled day of the program or to be held on a Saturday – which will be decided among all of the participants, please see schedule in appendix attached) and with one follow-up session four weeks after completion of the MBSR program

- A copy of the 8-Week MBSR Program agenda is also attached to this form for you to read

- We are hoping that the group will be made up of anywhere from 15-20 participants, of all genders

Activities, duties and responsibilities and other activities when participating in the study will include:

- Supporting and providing accommodation(s) to participants' needs for any of the activities in the MBSR program, e.g., supporting participants to lie down, sit and/or stand if they chose based on their health condition throughout the 8-Weeks

- Establishing group norms reinforcing this with the group e.g. confidentiality, privacy, etc. and WCH policy e.g. scent-free policy, etc. Therefore, creating a safe and comfortable environment for participants to feel free to speak and share their experiences fully

- Each clinician will be responsible for confidentiality as to anything pertaining to the study (e.g. field notes, meeting minutes, participants' data)

- Observing the group when PI is delivering the MBSR curriculum, and participating in guiding any of the mindfulness practices if you feel comfortable.

- Being present to assist in any technical support around the iPad use if able

- Making written field notes (collected by the PI at the end of each session) on your clinical observation and what you may find “surprising” or communicating verbally to PI (one-on-one) or during the clinician’s meetings for the duration of study

- Each clinician will also be expected to interact with the Research Assistant (RA) and to make sure the RA administrative duties are done (e.g. which participants to call if no show or is away, to make sure the surveys are collected, setting up the room, to answer any of the RA’s questions if able, etc.)

- Assisting participants by answering any of their questions or concerns and by addressing any difficulties or challenging (e.g. physical or psychosocial) that may arise while participating in the study

- Please feel free to ask the PI anything that further needs clarification, that is not mentioned on this consent form, that may arise and need to be addressed

What are the possible harms of taking part in this study?
You may have short- or long-term concerns that may interfere with your ability to participate due time, work schedule and clinical caseload.

There may be unforeseeable harms that may arise (e.g. a participant may fall, may need more assistance with their iPad, need more verbal cueing). If you experience any difficulties, challenges or ability to follow and keep up with the pace of the study, you can speak to the PI to assist and support you in order to participate in this research study.

What are the possible benefits of participating in this study?
As a participant carrying out this study, you will be involved in mindfulness practices as well and may or may not experience any benefits of mindfulness as every participant is different. Most importantly, your feedback (throughout the study and also in the focus group), will help to further develop and enhance future MBSR groups for those living with SCD and MCI in primary care and other settings. Additionally, the study will assess the benefits of possibly using MBSR to ameliorate psychosocial issues and perceived satisfaction of functional performance for those living with SCD and MCI.

What happens if I decide not to take part in this research study?
Your participation in this study is completely voluntary as your decision to take part or not in this research study is completely optional. Participation or non-participation will have no effect on your employment at WCH. However, you are responsible to notify and to seek permissions from your manager(s) to be away from the typical work day for times when you are involved with running the study. If you wish for me to assist in any way to facilitate your involvement, please do not hesitate to contact me directly.

Do I have the right to withdraw?
You can withdraw from this study at any time by contacting the PI (TT). If you withdraw your participation, your data provided to date may still be used as part of the study. The iPad will be given to you (even if you are unable to participate in the study) once the study is completed.

Length of Study

The length of the study will be 11 sessions in total, consisting of: i. Orientation (3 hours), ii. The 8-week MBSR program (3 hours per week), iii. An all-day Saturday retreat (this may be on a week day based on participant's and staff availability - 6 hours), and iv. A focus-group 1-month after the program (1.5 hours).

Confidentiality

We respect your privacy and will do our outmost to keep all information about yourself collected or obtained confidential. Only the research team members will have access to this information. The research study staff, the WCH Research Ethics Board, Queen's Committee Members and employees of the sponsor or funder of the study will have access to your data only for purposes related with this study. The research team and those mentioned are the only people authorized to view your research data only under the supervision of the PI and will be obligated to protect your privacy and not disclose your personal information. None of your personal information will be made public unless necessary by the law. If the research results are published, your identity will remain confidential. The risk of identifying you from the study data is negligible, however it can never be completely eliminated. The study data will be kept in a secure location for ten years, then destroyed.

It is important to note that as staff members, we are very serious about confidentiality, however, we cannot guarantee that other participants in the group will maintain confidentiality (if you were to discuss anything in a group or one-on-one to other participants). We will, however, convey the importance of maintaining confidentiality throughout the duration of program as this is something we would request from all participants in the study.

If I have questions or problems, whom should I contact?

If you have any questions, please feel free to contact the PI:

Todd Tran OT Reg (Ont),
Principal Investigator
416-323-6525
Todd.Tran@wchospital.ca

If you have questions or concerns about your experience as a research participant, you can contact the Chair of the Research Ethics Board at Women's College Hospital, Dr. Nancy Walton, at 416-351-3732, extension 2325. The Research Ethics Board are a group of people who are not involved in this study and who have ethical oversight of research activities.

Participant

By signing this form, I confirm that:

- This research study has been fully explained to me and all of my questions answered to my satisfaction
- I understand the requirements of participating in this research study
- I have been informed of the risks and benefits, if any, of participating in this research study
- I have been informed of any alternatives to participating in this research study
- I have been informed of the rights of research participants
- I have read each page of this form
- I have agreed to participate in this study

☐ I have consented to participating in this study

________________________	__________________________	___________________
Name of participant (print)	Signature	Date (MM/DD/YY)

Person obtaining consent
By signing this form, I confirm that:

- This study and its purpose have been explained to the participant named above
- All questions asked by the participant have been answered
- I will give a copy of this signed and dated document to the participant

____________________________	__________________________	___________
Name of participant Consent (print)	Signature	Date

I acknowledge my responsibility for the care and well-being of the above participant, to respect the rights and wishes of the participant as described in this informed consent document, and to conduct this study according to all applicable laws, regulations and guidelines relating to the ethical and legal conduct of research.

Name: ____

Signature of PI: ____________________________________

Date: ____

Confirming Consent for Focus Group – (between Week-6 to Week-12)

☐ I consent to participate in a focus group

☐ No, I do not consent to participate in a focus group

Name of participant	Signature	Date

Person obtaining consent

By signing this form, I confirm that:

- This study and its purpose has been explained to the participant named above
- All questions asked by the participant have been answered
- I will give a copy of this signed and dated document to the participant

Name of Person obtaining Consent (print)	Signature	Date

Our 8-Week Mindfulness-Based Stress Reduction MBSR Program will be as follows:

77 Grenville St.
Family Practice: Room 202
3.0 hours in duration (with a break)

Roles (if able):

- Taking field notes
- Observing participants
- Providing assistance (e.g. Offering different positions in yoga, technology iPads) participants weekly
- Participate in regular research meetings
- Making sure we are following the Agenda
- Participating in a focus-group at approximately four weeks after the MBSR program, only if agreeable in participating

Agenda:

Week 1

Guidelines of the Program
Outline the principles and process of the Program with the participants and their companion
Completing intake surveys
Introductions (participants, companion and the team of six occupational therapists)
What is Mindfulness?
Discussion around Memory and dementia and the importance of Mindfulness practice
Q & A period
Introducing the concept of Formal and Informal Mindfulness practices
Handing out the iPad Mini and showing participants and their companion how to use it
In-class mindfulness practice – the Body Scan meditation 10 mins
Debrief
Home practice: Formal practice Body Scan meditation 10 minutes 2x/day

Week 2

Collecting surveys or completing surveys if not done
Introductions again if any new participants joining the group
Education around the importance of Mindfulness practice and tying it to Memory
In-class informal mindfulness practice with guided instructions i.e., mindful eating
Debrief
Discussion around homework from last week (any barriers or challenges)
Discussion around difficulty with technology use etc.…
In-class formal practice Body Scan 10 mins
Debrief
Home practice: Formal practice of the Body Scan meditation and 10 mins x/day and
Informal practice in daily life i.e., mindful eating

Week 3

In-class Breath meditation with guided instructions emphasizing present-moment, curiosity, open mind, wandering mind etc. (10 mins)
Debrief

Discussion around technology use, other apps on the iPad Mini participants can learn and use ie. camera, setting up Wi-Fi, FaceTime, etc.
Discussion around Memory strategies (visual, audio cues, reminders etc.)
In-class Breath meditation (5 mins)
Home practice: Formal practice of the Body Scan (2 x 10 mins OR Breath meditations daily)
Informal practice: Eating

Week 4
In-class Breath meditation with guided instructions emphasizing present-moment, curiosity, open mind, wandering mind etc. (10 mins)
Debrief
Discussion of last week's Home Practice
Sleep and its effect on Brain health
Mental Exercises (cross word puzzles, Sudoku, spot the differences, etc.
Debrief
In class meditation (5 mins)
Home Practice: Formal practice of the Body Scan (2 x 10 mins OR Breath meditations daily)
Informal practice: eating
Emphasize that Mindfulness can be done anywhere, anytime

Week 5
In-class mindful listening meditation with guided instructions (10 mins)
Debrief
Discussion of last week's home practice
Application of mindfulness and Activities of Daily Living (ADL), communications (talking and listening)
In-class mindfulness exercises with guided instructions i.e., Communicating with Awareness
Debrief
In-class Breath meditation with guided instructions emphasizing present-moment, curiosity, open mind, wandering mind etc. (10 mins)
Home practice: Formal practice of the Body Scan (2 x 10 mins OR Breath meditations daily)
Informal practice: Mindful communication

Week 6
In-class mindfulness meditation with guided instructions (10 mins)
Debrief
Discussion of last week's Home Practice
Application of mindfulness and Activities of Daily Living (ADL), medication management/adherence and (strategies)
Introduction of Mindful Walking (10 mins)
Debrief
Home Practice: Formal practice of the Body Scan (2 x 10 mins OR Breath meditations daily)
Informal practice: mindful movement i.e., walking, physical exercise, mindful movement

MBSR All Day Class Agenda
Welcome, guidelines for the day: silence, no eye contact, self-care, availability of teachers etc.
Sitting Meditation: focus on awareness of breathing
Guided Yoga, with option of ending with short body scan
Slow walking meditation: with introductory guidance
Sitting Meditation: less guidance, more silence

Brief talk, teaching story, poem, drawing out theme such as mindfulness skills across multiple situations in life, cultivating a sense of presence from moment-to-moment, and being open to any experience, whether evaluated as pleasant, unpleasant, or neutral, as an opportunity to practice mindful attention
Lunch instructions - Silent Lunch, mindful walking, self-care
Mountain or Lake Meditation
Slow/fast walking exercise with specific verbal guidance – repeated instructions for noticing, in movement and stillness, various mind-body experiences. Emphasize options for meeting needs as they arise, and the possibility for moving in and out of the exercise
Loving Kindness meditation, ending in stillness
Optional ending practices
Short sittings alternated with short walking, sitting anywhere when change occurs
Mindful walking, gazing out window, stopping and noticing one thing, followed by an open awareness meditation
Dissolving the silence by whispering in pairs
Group Discussion and Dialogue
Closing ceremony

Week 7

In-class meditation with guided instructions (10 mins)
Debrief
Mindfulness of Activities of Daily Living (ADL) e.g., cooking, shopping,
Discussion of last week's Home Practice
Mindfulness and Stress, Anxiety, and Depression: the importance of being present in the moment vs. role of default mental activity in mental health problems
In-class meditation with guided instructions (15 mins)
Debrief
Home Practice: Formal practice of the Body Scan (2 x 10 mins OR Breath meditations daily)
Noticing stress response, default mode and returning attention to present
Informal practice: Mindful communication, eating or physical exercises

Week 8

In-class meditation with guided instructions (10 mins)
Debrief
Discussion of last week's Home Practice
Mindfulness and Emotion Management
In-class "Working with distractions"
The last hour will be a recorded focus group
Debrief
Home Practice: Formal practice of the Body Scan (2 x 20 mins OR Breath meditations daily)
Informal practice: Mindful communication, eating, walking or physical exercises

1-Month Follow-Up (Focus Group)

Appendix C – Recruitment Ad for the Study

Are you experiencing MEMORY TROUBLES and also experiencing ANXIETY, LOW MOOD, and STRESS related to your MEMORY?

- Do you experience memory troubles, which is also causing you to experience anxiety, low mood, stress, OR emotional distress related to your memory?
- Are you interested in learning ways to help manage some of these feelings or concerns through an 8-Week Mindfulness Course?
- Are you 60 years and older?
- Are you able to speak and read in English fluently?
- Are you a WCH patient?

We are conducting a *Research Study* to look at how mindfulness may assist with the psychosocial effects with memory.

Compensation will be provided.

Please contact: Todd for more information 416-323-6525
An evaluation will be done in-person to see if you are eligible to take part.

WCH WOMEN'S COLLEGE HOSPITAL Health care for women | REVOLUTIONIZED

Queen's UNIVERSITY

Appendix C: REB Clearance Letter from WCH

WCH
WOMEN'S COLLEGE HOSPITAL
Health care for women | REVOLUTIONIZED

Women's College Hospital
Research Ethics Office
76 Grenville Street, Room 6341
Toronto, ON M5S 1B2
Tel: 416.351.3732 x2723

Notification of REB Amendment Approval

Date:	30 January, 2019
To:	Mr. Todd Tran
Re:	2017-0056-E 12-Week Mindful Aging: Cognitive Program
Sponsor:	The Spark Program - Canadian Centre for Brain Aging and Health Innovation
REB Review Type:	Delegated
Initial REB Approval Date:	26 July, 2017
REB Amendment Approval Date:	28 January, 2019
REB Expiry Date:	26 July, 2019
Documents Approved:	Amendment Application Form #2; Received Date: 29-Oct-2018 Protocol; Version Date: Oct-2018 Focus Group Questions for Clinicians; Version 1, Version Date: Oct-2018 Focus Group Questions for Participants; Version 1, Version Date: Oct-2018 Consent Form for Participants; Version 7, Version Date: Jan-2019 Consent Form for Clinicians; Version 2, Version Date: Jan-2019 General Instructions for the Questionnaires; Version 4, Version Date: Jan-2019 Ineligibility Handout for Participants based on MoCA - Cognitive Screen; Version 1,Version Date: Oct-2018 Ineligibility Handout for Participants based on GDS - Depression Screen; Version 1, Version Date: Oct-2018 Advertisement for Research Study; Version 2, Version Date: Jan-2019 Recruitment Guiding Script; Version Date: Oct-2018 Perceived Stress Scale; Received Date: 18-Jan-2019 Geriatric Anxiety Inventory; Received Date: 18-Jan-2019 Cognitive and Affective Mindfulness Scaled - Revised; Received Date: 18-Jan-2019 Acceptance and Action Questionnaire -II; Received Date: 18-Jan-2019

Amendments to the above named study have been reviewed and approved by the Women's College Hospital Research Ethics Board. If, during the course of the research, there are any serious adverse events, confidentiality concerns, changes in the approved project, or any new information that must be considered with respect to the project, these should be brought to the immediate attention of the REB. In the event of a privacy breach, you are responsible for reporting the breach to the WCH REB and the WCH Corporate Privacy Officer (in accordance with Ontario health privacy legislation – Personal Health Information Protection Act, 2004). Additionally, the WCH REB requires reports of inappropriate/unauthorized use of the information.

If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval. The REB must be notified of the completion or termination of this study and a final report provided. As the Principal Investigator, you are responsible for the ethical conduct of this study.

The WCH Research Ethics Board operates in compliance with, and is constituted in accordance with, the requirements of the Tri¬-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); the International Conference on Harmonization Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Devices Regulations and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. Research Ethics Board is qualified through the CTO REB Qualification Program and is registered with the U.S. Department of Health and Human Services (DHHS) Office for Human Research Protection (OHRP).

Sincerely,

Nancy Walton BSc.N, RN, PhD, Chair, Women's College Hospital Research Ethics Board

Appendix D: REB Clearance Letter from Queen's University

Queen's UNIVERSITY

QUEEN'S UNIVERSITY HEALTH SCIENCES & AFFILIATED TEACHING HOSPITALS RESEARCH ETHICS BOARD (HSREB)

HSREB Initial Ethics Clearance

April 18, 2019

Mr. Todd Tran
Ph.D. Candidate
Women's College Hospital

TRAQ #: 6026418
Department Code: REH-747-19
Study Title: "Mixed methods, feasibility randomized control trial of Mindfulness-Based Stress Reduction (MBSR) with older adults living with subjective cognitive decline (SCD) and mild cognitive impairment (MCI): a primary care context"
Supervisor: Dr. Catherine Donnelly
Review Type: Delegated
Date Ethics Clearance Issued: April 18, 2019
Ethics Clearance Expiry Date: April 18, 2020

Dear Mr. Tran:

The Queen's University Health Sciences & Affiliated Teaching Hospitals Research Ethics Board (HSREB) has reviewed the application and granted ethics clearance for the documents listed below. Ethics clearance is granted until the expiration date noted above.

- Consent Form for Clinicians v.2019APR15
- Consent Form for Participants v.2019APR15
- General Instructions and Demographic Questionnaire v.2019MAR26
- Surveys and Assessments v.2019MAR26

Documents Acknowledged:
- CORE training certificate: T. Tran
- Budget Mar2019
- REB approval letter from Clinical Site at Women's College Hospital v.2019JAN30

Amendments: No deviation from, or changes to the protocol should be initiated without prior written clearance or an appropriate amendment from the HSREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the study.

Renewals: Prior to the expiration of your ethics clearance you will be reminded to submit your annual renewal event form through TRAQ. Any lapses in ethical clearance will be documented on the annual renewal clearance letter.

Completion/Termination: The HSREB must be notified of the completion or termination of this study through the completion of a study closure event in TRAQ.

Reporting of Serious Adverse Events: Any unexpected serious adverse events occurring locally must be reported within 2 working days or earlier if required by the study sponsor. All other serious adverse events must be reported within 15 days after becoming aware of the information.

Reporting of Complaints: Any complaints made by participants or persons acting on behalf of participants must be reported to the Research Ethics Board within 7 days of becoming aware of the complaint.

<u>Note: All documents supplied to participants must have the contact information for the Research Ethics Board.</u>

Investigators please note that if your study is registered by the sponsor, you must take responsibility to ensure that the registration information is accurate and complete.

Yours sincerely,

Albert F. Clark

Albert F. Clark, PhD
Chair, Queen's University Health Sciences and Affiliated Teaching Hospitals Ethics Board

The HSREB operates in compliance with, and is constituted in accordance with, he requirements of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); the international Conference on Harmonisation Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Product Regulations; Part 3 of the Medical Devices Regulations, and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The HSREB is qualified through the CTO REB Qualification Program and is registered with the U.S. Department of Health and Human Services (DHHS) Office for Human Research Protection (OHRP). Federalwide Assurance Number: FWA#: 00004184, IRB#: 00001173

HSREB members involved in the research project do not participate in the review, discussion or decision.

Appendix E: Outcome Measures

i. Geriatric Depression Scale (GDS)

Geriatric Depression Scale: Short Form

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? YES / **NO**

2. Have you dropped many of your activities and interests? **YES** / NO

3. Do you feel that your life is empty? **YES** / NO

4. Do you often get bored? **YES** / NO

5. Are you in good spirits most of the time? YES / **NO**

6. Are you afraid that something bad is going to happen to you? **YES** / NO

7. Do you feel happy most of the time? YES / **NO**

8. Do you often feel helpless? **YES** / NO

9. Do you prefer to stay at home, rather than going out and doing new things? **YES** / NO

10. Do you feel you have more problems with memory than most? **YES** / NO

11. Do you think it is wonderful to be alive now? YES / **NO**

12. Do you feel pretty worthless the way you are now? **YES** / NO

13. Do you feel full of energy? YES / **NO**

14. Do you feel that your situation is hopeless? **YES** / NO

15. Do you think that most people are better off than you are? **YES** / NO

Answers in **bold** indicate depression. Score 1 point for each bolded answer.

A score > 5 points is suggestive of depression.
A score ≥ 10 points is almost always indicative of depression.
A score > 5 points should warrant a follow-up comprehensive assessment.

Source: http://www.stanford.edu/~yesavage/GDS.html

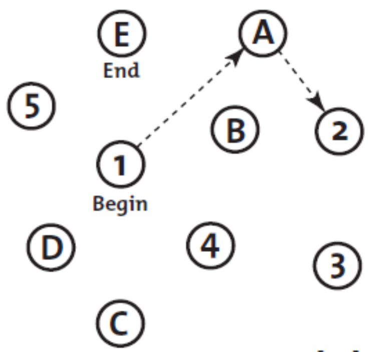
The Hartford Institute for Geriatric Nursing would like to acknowledge the original author of this Try This, Lenore Kurlowicz, PhD, RN, CS, FAAN, who made significant contributions to the field of geropsychiatric nursing and passed away in 2007.

ii. Montreal Cognitive Assessment (MoCA)

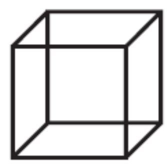
MONTREAL COGNITIVE ASSESSMENT (MOCA)

NAME :
Education :
Sex :
Date of birth :
DATE :

VISUOSPATIAL / EXECUTIVE



[ ]



Copy cube

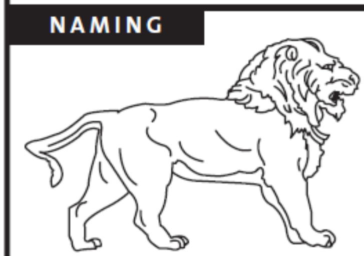
[ ]

Draw CLOCK (Ten past eleven)
(3 points)

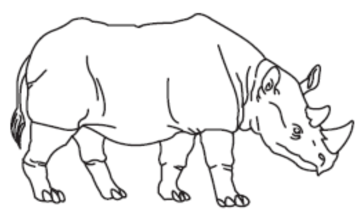
[ ] Contour [ ] Numbers [ ] Hands

POINTS ___/5

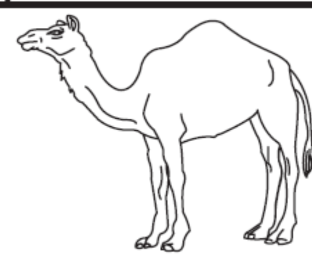
NAMING



[ ]



[ ]



[ ]

___/3

MEMORY

Read list of words, subject must repeat them. Do 2 trials. Do a recall after 5 minutes.

	FACE	VELVET	CHURCH	DAISY	RED
1st trial					
2nd trial					

No points

ATTENTION

Read list of digits (1 digit/ sec.). Subject has to repeat them in the forward order [ ] 2 1 8 5 4
Subject has to repeat them in the backward order [ ] 7 4 2

___/2

Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors
[ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B

___/1

Serial 7 subtraction starting at 100 [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65
4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt**, 0 correct: **0 pt**

___/3

LANGUAGE

Repeat : I only know that John is the one to help today. [ ]
The cat always hid under the couch when dogs were in the room. [ ]

___/2

Fluency / Name maximum number of words in one minute that begin with the letter F [ ] ____ (N ≥ 11 words)

___/1

ABSTRACTION

Similarity between e.g. banana - orange = fruit [ ] train – bicycle [ ] watch - ruler

___/2

DELAYED RECALL

Has to recall words WITH NO CUE	FACE [ ]	VELVET [ ]	CHURCH [ ]	DAISY [ ]	RED [ ]	Points for UNCUED recall only
Optional: Category cue						
Optional: Multiple choice cue						

___/5

ORIENTATION

[ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City

___/6

Normal ≥ 26 / 30

TOTAL ___/30
Add 1 point if ≤ 12 yr edu

iii. Ineligibility Handout for Participants (MoCA)

WOMEN'S COLLEGE HOSPITAL
Health care for women | REVOLUTIONIZED

Dear Participant,

Thank-you for your interest in the study "*Mindfulness-Based Stress Reduction (MBSR) for Older Adults with Memory Concerns*" being conducted by Todd Tran at Women's College Hospital, Family Health Team, in partnership with Queen's University. We appreciate your participation and willingness to be screened for this study.

Due to your score on the Montreal Cognitive Assessment (MoCA), unfortunately, your score is below the cut-off for eligibility to participate in the study. This is a quick cognitive screen for memory, delayed recall, abstraction, visuospatial and other cognitive domains.

You took the MoCA on this date: (____________________)
MM DD YY

The average score on the MoCA was: ____________________

The score of 22.1 or lower, indicates a need for further follow-up or routine care of your cognition and overall healthcare needs, through your family physician.

Because of your score, we do not think that mindfulness intervention is the best fit for your needs at the present time. We suggest that you contact your health care provider to talk about options that may be available to you to help manage your memory concerns.

It may be helpful for you to take this sheet with you the next time you meet with your health care provider about your memory concerns so that they have your MoCA score.

We have included a resource pamphlet from the Alzheimer's Society for your information. You may find want to connect with this resource in conjunction with speaking to your health care provider.

If you have any questions or concerns regarding this study, please do not hesitate to contact me the Principal Investigator, Todd Tran at 416-323-6525.

Benefits of an early diagnosis

People with dementia can live meaningful and productive lives for many years after an early diagnosis. Dementia diagnosed early helps both the person and family members to learn about the disease, set realistic expectations and plan for their future together. There are many benefits to an early diagnosis. Here are our top 10:

- **Getting an accurate diagnosis**
  Conditions such as depression, thyroid disease, infections or drug interactions sometimes produce symptoms similar to those of dementia. A thorough medical assessment can lead to an accurate diagnosis so that appropriate treatment can begin.

- **Being actively involved in health care and personal decisions**
  Earlier in the process, the person is able to participate more actively in their own health-care decisions and future plans.

- **Using medications effectively**
  Treatment of Alzheimer's disease and other dementias is typically most effective when started early in the disease process.

- **Focusing on what's important**
  An early diagnosis allows the person to set priorities based on what is important to them, such as travelling, pursuing new goals, or deciding when to stop working.

- **Making choices is empowering**
  An early diagnosis allows the person with dementia to make informed decisions about legal, financial and care matters and make their wishes known to their family and friends.

- **Taking advantage of resources**
  The person and their family can benefit from local Alzheimer Society information, support and education programs to learn how to live well with dementia.

- **Supporting families**
  Families who understand the disease and the challenges that come with its progression are better able to support the person with dementia and get the help that's right for them.

- **Advocating**
  People with dementia can make their voices heard to raise awareness about the disease, the need for quality care and increased funding for research.

- **Advancing research**
  People with dementia can participate in clinical trials and other research to help improve diagnosis and enhance care.

- **Reducing stigma**
  People with dementia can continue to live life to the fullest. Sharing experiences of living with dementia can be very helpful in reducing the stigma of the disease and in encouraging others to reach out for support.

The Alzheimer Society of Canada acknowledges the Alzheimer's & Dementia Alliance of Wisconsin for their website content, which has been modified with permission.

Forget Me Not / Ne m'oubliez pas

Société Alzheimer Society

iv. Ineligibility Handout for Participants (GDS)

Dear Participant,

Thank-you for your interest in the study "*Mindfulness-Based Stress Reduction (MBSR) for Older Adults with Memory Concerns"* being conducted by Todd Tran, at Women's College Hospital, Family Health Team, in partnership with Queen's University. We appreciate your participation and willingness to be screened for this study.

Due to your high score on the Geriatric Depression Scale (GDS), unfortunately, you are not eligible to participate in the study. This is a Yes or No questionnaire used to screen for depression in older adults for depression. The GDS asks about the frequency of depressive mood (feelings of hopelessness and helplessness) over the past week.

You took the GDS on this date: (____________________)
MM DD YY

The average score on the GDS was: ____________________

The score above 5 or indicates a need for further follow-up to determine whether you meet the criteria for depression.

Because of your score, we do not think that mindfulness intervention is the best fit for your needs at the present time. We suggest that you contact your health care provider to talk about options that may be available to you to help manage your mood and memory concerns.

It may be helpful for you to take this sheet with you the next time you meet with your health care provider about your memory concerns so that they have your GDS score.

We have included a resource pamphlet for older adults and depression for your information. You may want to connect with this resource in conjunction with speaking to your health care provider.

If you have any questions or concerns regarding this study, please do not hesitate to contact me the Principal Investigator, Todd Tran at 416-323-6525.

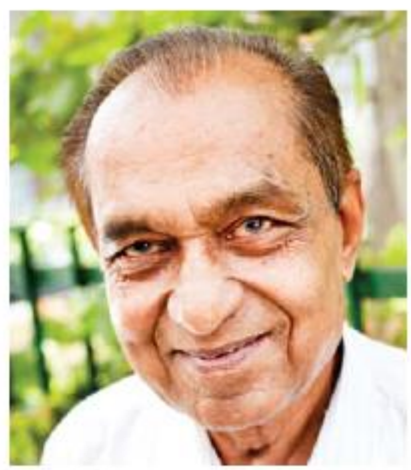
Depression in Older Adults. You Are Not Alone!

LEARN MORE + TAKE ACTION

Feeling sad or lonely is not a part of aging

Being a senior can be a time of great joy, and great losses. These years do not have to include mood swings, low energy, and poor focus. Having those challenges does not mean you are weak. **They might be due to a serious medical issue – depression.**

Depression is more than just having a bad day or feeling down. If you feel sad, hopeless or bored with things you normally enjoy, for weeks or months... you may be experiencing depression.



There is hope!

Along with medical help, there are many ways to feel better. Small lifestyle changes can greatly improve your well-being. Call a friend. Be around other people. Listen to music. Join an activity. Go for a walk. Feel the sun on your face. You deserve to be well and enjoy your senior years!

WHAT IS DEPRESSION?

Depression can affect your feelings, body and relationships. Being depressed can make it hard to picture ever feeling good again.

It often does not get better on its own. It may even last for years without treatment. If you have any of these symptoms for more than two weeks, seek help.

✔ Check off the symptoms that you have. Then show this checklist to your health care provider.

☐ Feeling sad, lonely or anxious

☐ Feeling guilty or having regrets

☐ Loss of pleasure from your favourite things

☐ Sleeping problems (too much or not enough)

☐ Problems thinking and focusing

☐ Less energy / feeling tired or slow

☐ Feeling unwell / more aches and pains / irritated

☐ Changes in eating habits or weight

☐ Thinking about suicide or death*

* If you (or someone you know) are thinking of hurting yourself or ending your life, call 911 now, or go to the hospital emergency room.

Think you might have depression?

Get help from a health expert!
It is important, even if you might be depressed. No family doctor? There are other options: visit a walk-in clinic, hospital, pharmacist or local health centre.

HOW IS DEPRESSION DIAGNOSED?

To know if you have depression, your doctor will likely:
- Discuss your thoughts and feelings to understand what is happening in your life.
- Do a physical exam and run tests to rule out other issues.

Family members often notice changes in the mood or behaviour of loved ones. Consider bringing someone with you for support.

Make the most of your doctor visit

Depression is an illness like any other. Tell your doctor how you feel. Talking with a medical expert is a major step to getting help and feeling better.

TIPS:

- Go with a family member or friend.
- Bring your checklist and any health notes.
- Explain your symptoms that seem like depression.
- Ask for more information about depression.
- Ask for names of counselors and therapists in your community.
- Book a follow-up visit for soon after.

Before your visit, think about:

When did these feelings start?

____

Have they gotten worse?

____

Are there times when things are better?

____

HOW IS DEPRESSION TREATED?

There are many ways to treat depression. Using a few different treatments gives better results. Your health care provider can explain the pros and cons, to help pick your best options.

1. Health and social supports

Even small changes can boost your mood. Learn more about depression, join support groups or activities in your community, exercise, and eat well.

2. Counselling and therapy

Many people find it helpful to talk about their feelings. Counselling can help you understand your thoughts and emotions. Experts can also help you find ways to feel better.

3. Medication

If needed, your doctor will prescribe medicine (antidepressants) to treat your depression. Many options are available. Knowing how severe your depression is and what other medication you take will help your doctor choose the right one for you.

Facts about antidepressants:
- They work best when taken daily, as prescribed.
- They are not addictive.
- It may take 4–6 weeks to start feeling better.
- Some side effects may occur, most can be managed and resolved.
- Even if you are feeling better, or side effects continue, talk with your doctor or pharmacist before stopping or changing the amount of medicine you are taking. Those experts can help to avoid the return of your signs of depression and to reduce side effects.

Important health phone numbers

Use this area to record numbers of organizations and services that can help you.

Emergency: 9-1-1

Doctor

____

Counsellor / Therapist

____

Pharmacist

____

Distress / Crisis Line

____

Local branch of Canadian Mental Health Association

____

Spiritual Leader or other community supports

____

This brochure is adapted from the CCSMH *National Guidelines for Seniors' Mental Health: The Assessment and Treatment of Depression*.

Developed with the financial support and collaboration of the Public Health Agency of Canada and Shoppers Drug Mart.

Canadian Coalition for Seniors' Mental Health
Coalition Canadienne pour la Santé Mentale des Personnes Âgées

Organization contacts

Canadian Coalition for Seniors' Mental Health (CCSMH)
www.ccsmh.ca

Canadian Association for Suicide Prevention (CASP)
www.suicideprevention.ca

Canadian Caregiver Coalition (CCC)
www.ccc-ccan.ca

Canadian Mental Health Association (CMHA)
www.cmha.ca

v. Patient Health Questionnaire (PHQ-9)

Patient Health Questionnaire (PHQ-9)

Patient name: ________________________________ Date: ________________

1. Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all (0)	Several days (1)	More than half the days (2)	Nearly every day (3)
a. Little interest or pleasure in doing things.	❐	❐	❐	❐
b. Feeling down, depressed, or hopeless.	❐	❐	❐	❐
c. Trouble falling/staying asleep, sleeping too much.	❐	❐	❐	❐
d. Feeling tired or having little energy.	❐	❐	❐	❐
e. Poor appetite or overeating.	❐	❐	❐	❐
f. Feeling bad about yourself, or that you are a failure, or have let yourself or your family down.	❐	❐	❐	❐
g. Trouble concentrating on things, such as reading the newspaper or watching TV.	❐	❐	❐	❐
h. Moving or speaking so slowly that other people could have noticed. Or the opposite; being so fidgety or restless that you have been moving around more than usual.	❐	❐	❐	❐
i. Thoughts that you would be better off dead or of hurting yourself in some way.	❐	❐	❐	❐

2. If you checked off any problem on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

❐ Not difficult at all ❐ Somewhat difficult ❐ Very difficult ❐ Extremely difficult

TOTAL SCORE ________________

Instructions – How to Score the PHQ-9

Major depressive disorder is suggested if:

- Of the 9 items, 5 or more are checked as at least 'more than half the days'
- Either item a. or b. is positive, that is, at least 'more than half the days'

Other depressive syndrome is suggested if:

- Of the 9 items, a., b. or c. is checked as at least 'more than half the days'
- Either item a. or b. is positive, that is, at least 'more than half the days'

Also, PHQ-9 scores can be used to plan and monitor treatment. To score the instrument, tally each response by the number value under the answer headings, (not at all=0, several days=1, more than half the days=2, and nearly every day=3). Add the numbers together to total the score on the bottom of the questionnaire. Interpret the score by using the guide listed below.

Guide for Interpreting PHQ-9 Scores

Score	**Recommended Actions**
0-4	Normal range or full remission. The score suggests the patient may not need depression treatment.
5-9	Minimal depressive symptoms. Support, educate, call if worse, return in 1 month.
10-14	Major depression, mild severity. Use clinical judgment about treatment, based on patient's duration of symptoms and functional impairment. Treat with antidepressant or psychotherapy.
15-19	Major depression, moderate severity. Warrants treatment for depression, using antidepressant, psychotherapy or a combination of treatment.
20 or higher	Major depression, severe severity. Warrants treatment with antidepressant and psychotherapy, especially if not improved on monotherapy; follow frequently.

Functional Health Assessment

The instrument also includes a functional health assessment. This asks the patient how emotional difficulties or problems impact work, things at home, or relationships with other people. Patient responses can be one of four: Not difficult at all, Somewhat difficult, Very difficult, Extremely difficult. The last two responses suggest that the patient's functionality is impaired. After treatment begins, functional status and number score can be measured to assess patient improvement.

For more information on using the PHQ-9, visit www.depression-primarycare.org

vi. General Anxiety Inventory (GAI)

Please answer the items according to how you've felt in the last week.

Tick the column under **Agree** if you mostly agree that the item describes you;
tick the column under **Disagree** if you mostly disagree that the item describes you.

	Agree	Disagree
I worry a lot of the time.		
I find it difficult to make a decision.		
I often feel jumpy.		
I find it hard to relax.		
I often cannot enjoy things because of my worries.		
Little things bother me a lot.		
I often feel like I have butterflies in my stomach.		
I think of myself as a worrier.		
I can't help worrying about even trivial things.		
I often feel nervous.		
My own thoughts often make me anxious.		
I get an upset stomach due to my worrying.		
I think of myself as a nervous person.		
I always anticipate the worst will happen.		
I often feel shaky inside.		
I think that my worries interfere with my life.		
My worries often overwhelm me.		
I sometimes feel a great knot in my stomach.		
I miss out on things because I worry too much.		
I often feel upset.		

Original GAI reference: Pachana, N.A., Byrne, G.J., Siddle, H., Koloski, N., Harley. E., & Arnold, E. (2007). Development and validation of the Geriatric Anxiety Inventory. International Psychogeriatrics, 19, 103-114.

vii. **Cognitive Affective Mindfulness Scale-Revised (CAMS-R)**

Cognitive and Affective Mindfulness Scale- Revised (CAMS-R)

Please respond to each item by marking <u>one box per row</u>		Rarely/Not at All	Sometimes	Often	Almost Always
CAMS-R1	It is easy for me to concentrate on what I am doing.	☐ 1	☐ 2	☐ 3	☐ 4
CAMS-R3	I can tolerate emotional pain.	☐ 1	☐ 2	☐ 3	☐ 4
CAMS-R4	I can accept things I cannot change.	☐ 1	☐ 2	☐ 3	☐ 4
CAMS-R5	I can usually describe how I feel at the moment in considerable detail.	☐ 1	☐ 2	☐ 3	☐ 4
CAMS-R6	I am easily distracted. (R)	☐ 4	☐ 3	☐ 2	☐ 1
CAMS-R8	It's easy for me to keep track of my thoughts and feelings.	☐ 1	☐ 2	☐ 3	☐ 4
CAMS-R9	I try to notice my thoughts without judging them.	☐ 1	☐ 2	☐ 3	☐ 4
CAMS-R10	I am able to accept the thoughts and feelings I have.	☐ 1	☐ 2	☐ 3	☐ 4
CAMS-R11	I am able to focus on the present moment.	☐ 1	☐ 2	☐ 3	☐ 4
CAMS-R12	I am able to pay close attention to one thing for a long period of time.	☐ 1	☐ 2	☐ 3	☐ 4

Scoring: Note that 6 is reversed scored. Sum of all values reflect greater mindful qualities.

Your total score: __________

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, *29*(3), 177-190.
Note that original scale was 12 items, but the original items 2 and 7 were deleted as less useful than the remaining 10.

viii. Perceived Stress Scale (PSS)

Perceived Stress Scale

A more precise measure of personal stress can be determined by using a variety of instruments that have been designed to help measure individual stress levels. The first of these is called the **Perceived Stress Scale**.

The Perceived Stress Scale (PSS) is a classic stress assessment instrument. The tool, while originally developed in 1983, remains a popular choice for helping us understand how different situations affect our feelings and our perceived stress. The questions in this scale ask about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

For each question choose from the following alternatives:
0 - never   1 - almost never   2 - sometimes   3 - fairly often   4 - very often

________ 1. In the last month, how often have you been upset because of something that happened unexpectedly?

________ 2. In the last month, how often have you felt that you were unable to control the important things in your life?

________ 3. In the last month, how often have you felt nervous and stressed?

________ 4. In the last month, how often have you felt confident about your ability to handle your personal problems?

________ 5. In the last month, how often have you felt that things were going your way?

________ 6. In the last month, how often have you found that you could not cope with all the things that you had to do?

________ 7. In the last month, how often have you been able to control irritations in your life?

________ 8. In the last month, how often have you felt that you were on top of things?

________ 9. In the last month, how often have you been angered because of things that happened that were outside of your control?

________ 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Figuring Your PSS Score

You can determine your PSS score by following these directions:

- First, reverse your scores for questions 4, 5, 7, and 8. On these 4 questions, change the scores like this:

  0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0.

- Now add up your scores for each item to get a total. **My total score is ___________.**

- Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress.
  - Scores ranging from 0-13 would be considered low stress.
  - Scores ranging from 14-26 would be considered moderate stress.
  - Scores ranging from 27-40 would be considered high perceived stress.

The Perceived Stress Scale is interesting and important because your perception of what is happening in your life is most important. Consider the idea that two individuals could have the exact same events and experiences in their lives for the past month. Depending on their perception, total score could put one of those individuals in the low stress category and the total score could put the second person in the high stress category.

Disclaimer: The scores on the following self-assessment do not reflect any particular diagnosis or course of treatment. They are meant as a tool to help assess your level of stress. If you have any further concerns about your current well being, you may contact EAP and talk confidentially to one of our specialists.

ix. Quality-of-Life – Alzheimer's disease (QoL-AD)

Quality of Life in Alzheimer's Disease

QOL-AD

Instructions for Interviewers

The QOL-AD is administered in interview format to individuals with dementia, following the instructions below. The interview is carried out with the subject and/or an informant. The subject should be interviewed alone.

Hand the form to the participant, so that he or she may look at it as you give the following instructions (instructions should closely follow the wording given in bold type):

I want to ask you some questions about your quality of life and have you rate different aspects of your life using one of four words: poor, fair, good, or excellent.

Point to each word (poor, fair, good, and excellent) on the form as you say it.

When you think about your life, there are different aspects, like your physical health, energy, family, money, and others. I'm going to ask you to rate each of these areas. We want to find out how you feel about your current situation in each area.

If you're not sure about what a question means, you can ask me about it. If you have difficulty rating any item, just give it your best guess.

It is usually apparent whether an individual understands the questions, and most individuals who are able to communicate and respond to simple questions can understand the measure. If the participant answers all questions the same, or says something that indicates a lack of understanding, the interviewer is encouraged to clarify the question. However, under no circumstances should the interviewer suggest a specific response. Each of the four possible responses should be presented, and the participant should pick one of the four.

If a participant is unable to choose a response to a particular item or items, this should be noted in the comments. If the participant is unable to comprehend and/or respond to two or more items, the testing may be discontinued, and this should be noted in the comments.

As you read the items listed below, ask the participant to circle her/his response. If the participant has difficulty circling the word, you may ask her/him to point to the word or say the word, and you may circle it for him or her. You should let the participant hold his or her own copy of the measure, and follow along as you read each item.

1. **First of all, how do you feel about your physical health? Would you say it's poor, fair, good, or excellent? Circle whichever word you think best describes your physical health right now.**

2. **How do you feel about your energy level? Do you think it is poor, fair, good, or excellent?** If the participant says that some days are better than others, ask him or her to rate how she/he has been feeling most of the time lately.

3. **How has your mood been lately? Have your spirits been good, or have you been feeling down? Would you rate your mood as poor, fair, good, or excellent?**

4. **How about your living situation? How do you feel about the place you live now? Would you say it's poor, fair, good, or excellent?**

5. **How about your memory? Would you say it is poor, fair, good, or excellent?**

6. **How about your family and your relationship with family members? Would you describe it as poor, fair, good, or excellent?** If the respondent says they have no family, ask about brothers, sisters, children, nieces, nephews.

7. **How do you feel about your marriage? How is your relationship with (spouse's name). Do you feel it's poor, fair, good, or excellent?** Some participants will be single, widowed, or divorced. When this is the case, ask how they feel about the person with whom they have the closest relationship, whether it's a family member or friend. If there is a family caregiver, ask about their relationship with this person. It there is no one appropriate, or the participant is unsure, score the item as missing.

8. **How would you describe your current relationship with your friends? Would you say it's poor, fair, good, or excellent?** If the respondent answers that they have no friends, or all their friends have died, probe further. **Do you have anyone you enjoy being with besides your family? Would you call that person a friend?** If the respondent still says they have no friends, ask **how do you feel about having no friends—poor, fair, good, or excellent?**
9. **How do you feel about yourself—when you think of your whole self, and all the different things about you, would you say it's poor, fair, good, or excellent?**
10. **How do you feel about your ability to do things like chores around the house or other things you need to do? Would you say it's poor, fair, good, or excellent?**
11. **How about your ability to do things for fun, that you enjoy? Would you say it's poor, fair, good, or excellent?**
12. **How do you feel about your current situation with money, your financial situation? Do you feel it's poor, fair, good, or excellent?** If the respondent hesitates, explain that you don't want to know what their situation is (as in amount of money), just how they feel about it.
13. **How would you describe your life as a whole. When you think about your life as a whole, everything together, how do you feel about your life? Would you say it's poor, fair, good, or excellent?**

Scoring instructions for QOL-AD:
Points are assigned to each item as follows: poor = 1, fair = 2, good = 3, excellent = 4.
The total score is the sum of all 13 items.

UWMC/ADPR/QOL
Aging and Dementia: Quality of Life in AD

Quality of Life: AD

(Participant Version)

ID Number	Assessment Number	Interview Date	Score (for clinician's use only)
□□□□□□	□□	□□ □□ □□ Month Day Year	

Instructions: Interviewer administer according to standard instructions. Circle your responses.

					Score
1. Physical health	Poor	Fair	Good	Excellent	
2 Energy	Poor	Fair	Good	Excellent	
3. Mood	Poor	Fair	Good	Excellent	
4. Living situation	Poor	Fair	Good	Excellent	
5. Memory	Poor	Fair	Good	Excellent	
6. Family	Poor	Fair	Good	Excellent	
7. Marriage	Poor	Fair	Good	Excellent	
8. Friends	Poor	Fair	Good	Excellent	
9. Self as a whole	Poor	Fair	Good	Excellent	
10. Ability to do chores around the house	Poor	Fair	Good	Excellent	
11. Ability to do things for fun	Poor	Fair	Good	Excellent	
12. Money	Poor	Fair	Good	Excellent	
13. Life as a whole	Poor	Fair	Good	Excellent	

Comments: ____ Total

____

x. Acceptance Action Questionnaire (AAQ-II)

AAQ-II

Below you will find a list of statements. Please rate how true each statement is for you by using the scale below to fill in your choice.

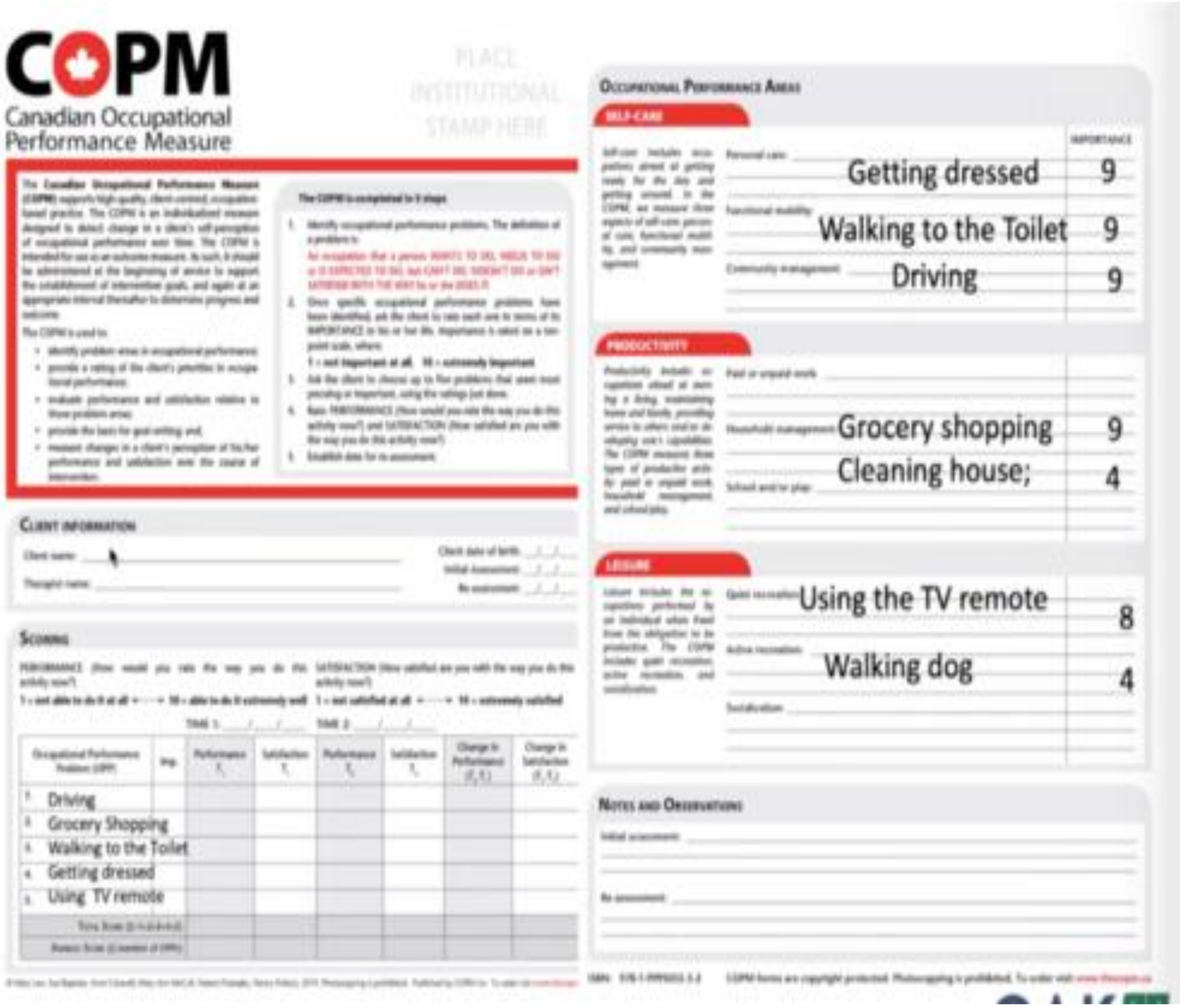
1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. My painful experiences and memories make it difficult for me to live a life that I would value.	
2. I'm afraid of my feelings.	
3. I worry about not being able to control my worries and feelings.	
4. My painful memories prevent me from having a fulfilling life.	
5. Emotions cause problems in my life.	
6. It seems like most people are handling their lives better than I am.	
7. Worries get in the way of my success.	
TOTAL	

This is a one-factor measure of psychological inflexibility, or experiential avoidance. Score the scale by summing the seven items. Higher scores equal greater levels of psychological inflexibility.

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (in press). Preliminary psychometric properties of the Acceptance and Action Questionnaire – II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*.

xi. Canadian Occupational Performance Measure (COPM)



COPM
Canadian Occupational Performance Measure

PLACE INSTITUTIONAL STAMP HERE

Client information

Scoring

Occupational Performance Problems (OPP)	Imp.	Performance T1	Satisfaction T1	Performance T2	Satisfaction T2	Change in Performance	Change in Satisfaction
1. Driving							
2. Grocery Shopping							
3. Walking to the Toilet							
4. Getting dressed							
5. Using TV remote							

Occupational Performance Areas

Self-care

Personal care: Getting dressed — 9
Functional mobility: Walking to the Toilet — 9
Community management: Driving — 9

Productivity

Paid or unpaid work
Household management: Grocery shopping — 9
Cleaning house; — 4
School and/or play

Leisure

Quiet recreation: Using the TV remote — 8
Active recreation: Walking dog — 4
Socialization

Notes and Observations

Initial assessment:

Re-assessment:

Appendix F: Patient Demographic Questionnaire

Demographics

Participant ID Number: __________

Based on International Consortium for Health Outcomes Measurement – Dementia Collection Reference Guide (2017)

Sex: ______ Male _____ Female (*Statistics Canada, 2016*)

Age: (please tick your answer) (*CIHI, 2011*)

_____ 60 to 64 years

_____ 65 to 74 years

_____ 75 to 84 years

_____ 85+ years

What is your marital status: (please tick whichever best describes your current situation) (*PewResearch.org; 2016*)

____ 1. Married

____ 2. Separated

____ 3. Divorced

____ 4. Widowed

____ 5. Never been married

____ 6. Other, please explain ____________

What is your current living arrangement? (Please circle answer)

(*Statistics Canada*, *2011*)

____ 1. Living alone

____ 2. Living in a couple (married spouse or common-law partner)

____ 3. Living with others (adult children, relatives and non-relatives)

Do you have any children?

No (circle) or if Yes, how many adult children? _____ female _____ male

What is the highest level of education that you have completed: (please tick the highest level you have completed)

(*Statistics Canada*, *2016*)

____ 1. High School Diploma

____ 2. Apprenticeship certificate

____ 3. College Diploma

____ 4. Bachelor's degree

____ 5. Master's degree

____ 6. Doctorate degree

Were you diagnosed with Mild Cognitive Impairment (MCI) by your doctor?

Please circle YES or NO

Are you currently employed? _____ Yes _______ No

If yes, what is your occupation? ___________________________

If retired, what was your occupation? _______________________

What is your household income approximately? (Please circle)

(*Statistics Canada – Income Survey, 2016*)

$10,000 to less than $15,000	$50,000 to less than $60,000
$15,000 to less than $20,000	$60,000 to less than $70,000
$20,000 to less than $25,000	$70,000 to less than $80,000
$25,000 to less than $30,000	$80,000 to less than $90,000
$30,000 to less than $40,000	$90,000 to less than $100,000
$40,000 to less than $50,000	$100,000 and over

Are you a smoker (cigars or tobacco)? No _____ Yes _____ Prefer not to say ____

How much do you smoke per day? ________

How much per week? _____

Do you consume alcohol? No _____ Yes _____ Prefer not to say ____

If yes, how many drinks per week on average? _________ drinks/week

What is your current weight? _______ lbs

How tall are you? _________ (in feet and inches)

Do you have previous head injury? No _____ Yes _____

If yes, what type of head injury, please explain (mild/minor, moderate or severe)?

____

What are the major stresses in your life?

____

Are you Physically Active? _____ Yes   ______ No

If yes, what physical activity are you involved in? _________________

What is the duration of your physical activity? ___________ (ie. 1 hour)

What is the frequency of your physical activity? ________________(ie. 2-3x a week)

Do you have a meditation practice yourself? _____ Yes   ______ No

If yes, how often do you meditate per week? _____________ hours

Appendix G: Focus Group Questions (Participants)

Guiding Questions

Introduction

Thank you for joining us at this focus group today. Your participation in developing Mindfulness-Based Stress Reduction (MBSR) is greatly appreciated.
As a reminder, the purpose of this focus group is to discuss the MBSR program and your experience as a participant. We will ask you about what works well about the program and areas that you would like to enhance.

This focus group should take no more than 60 minutes. The data will be analyzed to identify themes. Individual responses will remain confidential, and you will be identified in reporting by the use of pseudonyms. Your participation in this focus group is entirely voluntary. You are free to withdraw your consent to participate at any time before, during or after the focus group. If that is the case, we will not use any information you have provided to us. We ask that what is said in this focus group stays here – we want everyone to be comfortable sharing. If there are any questions that you do not wish to answer, you do not have to; however please try to answer and be as involved as possible. With your permission the focus group activities will be audio recorded. The recording will be used to ensure accuracy in the analysis of the data and will be destroyed once the project has been completed.

I want to review a couple of 'Ground rules' before we begin…

- We want you to do the talking. We/I may ask for examples or call on you but the goal is to ensure that everyone has time to respond to each question. There are a couple of questions that are specific to the healthcare providers or the MBSR teachers
- There are no right or wrong answers. Your opinion is important and disagreement is allowed. Speak up if you have a different opinion and it's even ok to change your mind based on what you hear
- Does anyone have any questions before we begin? (answers).

Are you still agreeable to participating in this focus group? OK, let's get started.

Sample Guiding Questions:

Primary Care

1. Firstly, you belong to an interprofessional team here in family practice that consists of a variety of health care professionals including occupational therapists. How can we as occupational therapists in family practice, support you in terms of your concerns around memory, focusing, concentration and such for overall brain health?

2. What are your thoughts about offering such a group like this in the future for older adults in family practice?

3. If there was an imaginary pill invented to help you with focusing, concentrating, to sustain your memory (but it comes with side effects like with any other medication) OR taking this program – which one would you consider as a viable option?

Technology:

1. How do you feel about using technology in this mindfulness program?

2. For those who used the iPad, what were some of your thoughts with using it?

3. What were some of the challenges if any, with using the iPad or Technology in this mindfulness program? Was there enough support given if you had any questions or help with the iPad?

4. Would it be worthwhile to use the iPad for a future group such as this going forward? (acceptability of technology). And can you elaborate why?

Overall Experience:

1. Think back to why you came originally, what were your expectations and why you continued with the program?

2. What did you want and hope for in participating in this mindfulness program?

3. What did you end up learning, if anything?

4. What was your overall experience with taking this Mindfulness program? (Satisfaction, Enablers or Barriers)

5. What do you see yourself taking away from this mindfulness program?

6. What set-backs or obstacles did you encounter, if any, while taking this mindfulness program? (Barriers)

7. Were there any sacrifices you had to make in order for you to participate in this mindfulness program?

8. What did you learn about yourself in working with these set-backs or obstacles? (Barriers, Enablers, Satisfaction, Acceptability)

9. What is your level of commitment to continuing with the mindfulness practices going forward? Why No? And if yes, what benefits do you think you would like to foster with continuing with the practices?

10. How will you continue to practice when this program is over?

Practicality:

1. Thoughts around timing, location, travel, day of the week, of the mindfulness group?

2. Thoughts around home practice around – overall experience?

3. What were some of your thoughts around the number of facilitators that were present during class?

4. Any comments or feedback about the facilitators?

Appendix H: Semi-Structured Interview Questions (Occupational Therapists)

Interview Questions with the Occupational Therapists

Primary Care

1. Do you think that such a mindfulness program can support this population living with subjective cognitive decline (SCD) or mild cognitive impairment (MCI) in a setting such family practice? (Enabler, Barriers, Facilitators)

2. To run a future mindfulness group with this particular population, what comments or feedback would you like to pass down to other occupational therapists who will be working in this primary care setting?

3. Is there any change that you would incorporate going forward in running such a group?

Technology

1. What was your overall experience with using technology with this group? (Enablers, Barriers, Facilitators)

2. Do you think that using technology such as iPads is acceptable or beneficial with this particular population?

3. Was the technology component useful or appropriate or acceptable in terms of delivery home practices for this mindfulness program?

4. Was the use of technology easy for this population to use?

5. What was your experience with assisting participants with their iPads?

6. Would you continue using technology or iPad to facilitate a future mindfulness group? Why?

Overall

7. As an MBSR teacher, is it feasible to run this program in a family practice setting such as the one that you just led? What made you say yes or no?

8. As a general occupational therapist working in primary care, what barriers do you foresee in running a future group with this population? (level of training, qualifications, time commitment, personal interest, costs, expertise, having one's own personal practice, scope of practice and having professional and personal practice having great job satisfaction / rewarding)

9. What was your overall experience in running this mindfulness program?

10. What obstacles, if any did you encounter while running this MBSR program?

11. Were there any obstacles, in running this MBSR program with this particular population?

12. What changes if any, you would like to make going forward?

13. Any last or final comments, feedback that you would like to add?

Appendix I: Feasibility Outcomes

a. Summary table of retention, login frequency, duration of practice, adherence and true adherence rate
b. Retention data
c. Login frequency
d. Login duration of formal home practice on tablets

A – Summary table of retention, login frequency, duration of practice, adherence and true adherence rate

N = 14	Participants	(iPad or CD)	Retention rate (completion of 6 ≥ sessions)	Login Frequency (3 logins/per week ≥ 39 logins) iPad ONLY	Total Hours of 19.5 hrs or more iPad and CDs Formal Only	Total Hours of 19.5 hrs or more iPad and CDs Combined formal and informal practice 19.5 hrs (All Participants)	*Adherence rate* (with 39-logins and only formal practice ≥19.5 hrs) iPad ONLY	*True adherence rate* (with completion of ≥6 sessions combined with both formal and informal practice ≥ 19 hrs) iPad and CDs – All Participants
1	Participant 2	iPad	Yes	No	No	Yes	No	Achieved (1/7)
2	Participant 7	iPad	Yes	Yes	Yes	Yes	Achieved (1/4)	Achieved (2/7)
3	Participant 8	CD	Yes	No (CD)	No	No	No	No
4	Participant 11	iPad	Yes	Yes	Yes	Yes	Achieved (2/4)	Achieved (3/7)
5	Participant 12	CD	No	No (CD)	No	No	No	No
6	Participant 13	iPad	Yes	No	No	No	No	No
7	Participant 16	CD	Yes	No (CD)	Yes	Yes	No	Achieved (4/7)
8	Participant 18	iPad	No	Yes	No	No	No	No
9	Participant 21	iPad	Yes	Yes	Yes	Yes	Achieved (3/4)	Achieved (5/7)
10	Participant 23	iPad	Yes	Yes	Yes	Yes	Achieved (4/4)	Achieved (6/7)
11	Participant 27	iPad	Yes	No	No	Yes	No	Achieved (7/7)
12	Participant 4	iPad	Withdrew					
13	Participant 17	iPad	Withdrew					
14	Participant 25	No Show	Withdrew					
	Summary 3/14 = 21% attrition 11/14 = 78.5% remained	10 iPads 3 CDs 1 No Show	9/14 = 64.3% (moderately successful) Exclude those withdrew: 9/11 = 81.8% - high retention rate	5/10 = 50%; login frequency Exclude those withdrew: 5/11 = 5/8= 62.5%	5/14 = 35.7% Exclude those withdrew: 5/11 = 45.4%	7/14 = 50% Exclude those withdrew: 7/11 = 63.6	4/10 = 40%; adherence rate (iPad only) Exclude those withdrew: 4/8 = 50%	7/14 = 50%; True adherence rate (iPad and CDs); Exclude those withdrew: 7/11 = 64% NB: 6/10= 60%; true adherence rate (iPad ONLY); Exclude those withdrew: 6/8 = 75%

NB: Future Retention rate may be those completed the intervention (78.5%) and follow-up (100%).

B – Retention Data (9/14 participants or 64.2%)

(Excluding those who withdrew 9/11 participants or 82% retention rate)

n	Attendance	Orientation	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7 (All Day)	Week 8	Week 9	Missed Days	Attendance Rate (10 sessions)	
1	Participant 2	yes	no	yes	yes	yes	yes	no	yes	yes	yes	2 of 10	80%	Achieved (1/9)
2	Participant 4	yes	yes	yes	Withdrew							7 of 10	30%	
3	Participant 7	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	1 of 10	90%	Achieved (2/9)
4	Participant 8	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	1 of 10	90%	Achieved (3/9)
5	Participant 11	yes	yes	no	yes	yes	yes	yes	no	yes	yes	2 of 10	80%	Achieved (4/9)
6	Participant 12	yes	no	no	no	yes	yes	no	yes	yes	no	5 of 10	50%	
7	Participant 13	yes	yes	yes	no	no	yes	yes	no	no	yes	4 of 10	60%	Achieved (5/9)
8	Participant 16	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	1 of 10	90%	Achieved (6/9)
9	Participant 17	yes	yes	Withdrew								2 of 10	20%	
10	Participant 18	yes	no	no	yes	yes	yes	no	no	no	no	6 of 10	40%	
11	Participant 21	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	0 of 9	100%	Achieved (7/9)
12	Participant 23	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	1 of 10	90%	Achieved (8/9)
13	Participant 25	Withdrew										0 of 10	0%	
14	Participant 27	yes	no	yes	no	yes	no	yes	no	yes	yes	4 of 10	60%	Achieved (9/9)

C – Login Frequency with Tablets (5/10 or 50% login frequency)

(Excluding those who withdrew, 5/8 or 62.5% login frequency)

Computer Tablet (iPad) Homework Logins Frequency

	N = 10 (for those who only used iPads)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7 All-Day	Week 8	Week 9 Post-MBSR	Week 10	Week 11	Week 12	Week 13 F/U	Total Logins	Goal Achieved 3 logins/per week ≥ 39 logins
1	Participant 2	2	4	3	2	1	0	1	2	0	0	0	0	0	15	
2	Participant 7	5	6	6	5	3	8	5	7	5	7	6	7	7	77	Achieved 1/5
3	Participant 11	5	5	4	5	4	6	2	2	2	3	4	1	0	43	Achieved 2/5
4	Participant 13	5	3	2	2	3	1	0	0	0	0	0	0	0	16	
5	Participant 18	0	0	5	9	1	1	6	5	1	0	1	10	2	41	Achieved 3/5
6	Participant 21	5	6	10	6	11	6	5	3	2	1	0	1	0	56	Achieved 4/5
7	Participant 23	4	6	0	7	6	6	5	9	5	7	7	7	2	71	Achieved 5/5
8	Participant 27	3	7	6	1	2	4	0	0	0	0	0	0	0	23	
9	Participant 4	withdrew														
10	Participant 17	withdrew														

D – Login Duration of Formal Home Practice on Tablets

4/10 participants or 40%; (excluding those who withdrew 4/8 participants or 50% achieved ≥ 19.5 hrs adherence rate for iPad)

iPad Homework Duration

	N = 10 (for those who only used iPads)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7 All-Day	Week 8	Week 9 Post-MBSR	Week 10	Week 11	Week 12	Week 13 F/U	Total (Minutes)	Total (Hours)	Goal Met ≥ 19.5 hrs (1,170 mins)
1	Participant 2	69.6	139.8	90.6	63.6	16.8	0	20.4	21.6	0	0	0	0	0	422.4	7.04	
2	Participant 7	154.8	209.4	183	144	86.4	202.8	155.4	267.6	184.2	249.6	204.6	253.8	204.6	2,500.2	41.67	Achieved (1/4)
3	Participant 11	186.6	186.6	135	145.2	125.4	189.6	61.8	61.8	67.2	86.4	132	16.8	0	1,394.4	23.24	Achieved (2/4)
4	Participant 13	141.6	93	63.6	67.2	88.2	22.8	22.8	0	0	0	0	0	0	499.2	8.32	
5	Participant 18	0	0	143.18	134.11	3.34	40.15	154.2	59.17	3.33	0.05	38.12	193.26	9.52	778.43	12.9738333	
6	Participant 21	240.6	204.6	138.6	136.8	204.6	142.8	135.6	90.6	34	34	0	34	0	1,396.2	23.27	Achieved (3/4)
7	Participant 23	142.2	126	1	201.6	209.4	191.4	150.6	261.6	180.6	247.2	256.2	256.2	69.6	2,293.6	38.23	Achieved (4/4)
8	Participant 27	93.6	256.2	209.4	38	70.2	73.8	0	0	1	0	0	0	0	742.2	12.37	
9	Participant 4	withdrew															
10	Participant 17	withdrew															

Therefore, adherence rate (tablets only): 40% or participants achieved both 39 logins and 19.5 hrs of home practice.

Appendix J: Sample Size Calculation

Sample size – Means

Compare the mean of a continuous measurement in two samples. The sample sizes are calculated in two different ways: first using the T statistic (with a non-centrality parameter), then using the Z statistic. The Z statistic approximates the T statistic, but provides sample sizes that are slightly too small. (We provide the Z statistic calculation to allow comparison with other calculators which use the Z approximation.)

Instructions: Enter parameters in the green cells. Answers will appear in the blue box below.

α (two-tailed) =	0.05	Threshold probability for rejecting the null hypothesis. Type I error rate.
β =	0.2	Probability of failing to reject the null hypothesis under the alternative hypothesis. Type II error rate.
q_1 =	0.5	Proportion of subjects that are in Group 1 (exposed)
q_0 =	0.500	Proportion of subjects that are in Group 0 (unexposed); $1-q_1$
E =	0.73	Effect size (If μ_1 = mean in Group 1 and μ_0 = mean in Group 0, then $E = \mu_1 - \mu_0$.)
S =	1.78	Standard deviation of the outcome in the population

Calculate

The standard normal deviate for $\alpha = Z_\alpha = 1.9600$

The standard normal deviate for $\beta = Z_\beta = 0.8416$

Standardized Effect Size = (E/S) = 0.410

1. Calculation using the T statistic and non-centrality parameter

N_1: **94**
N_0: **94**
Total: **188**

2. Normal approximation using the Z statistic instead of the T statistic

$A = (1/q_1 + 1/q_0) = 4.0000$

$B = (Z_\alpha + Z_\beta)^2 = 7.8489$

Total group size = $N = AB/(E/S)^2 = 186.664$

N_1: **94**
N_0: **93**
Total: **187**

This formula uses the Z statistic to approximate the T statistic. As a result it slightly underestimates the sample size. We provide this approximation to allow comparison to other calculators that use the Z statistic.