Motivational Interviewing and Injured Workers: Facilitating Behaviour Change in Work Rehabilitation

by

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ABSTRACT

Background: Work disability research confirms the importance of psychosocial factors and the decision making process of injured workers as determinants of disability from work-related musculoskeletal (MSK) disorders. Development and implementation of intervention programs specifically addressing psychosocial and behavioural risk factors may reduce work disability and increase return-to-work (RTW) rates. Further investigation is required to determine what theoretical models, tools and interventions are appropriate and effective for addressing psychosocial and behavioural factors associated with work-related MSK disorders.

Objectives: This thesis examined psychosocial and behavioural factors in work rehabilitation, including: 1) development of a comprehensive theoretical framework that considers injured workers' decision making processes to inform a specific intervention (motivational interviewing); 2) validation of the Readiness for Return to Work Scale in a work rehabilitation sample; and 3) evaluation of the effectiveness of motivational interviewing to address psychosocial barriers and facilitate behaviour change regarding RTW.

Methods: This thesis is comprised of three papers including a theoretical overview, cross-sectional study, and cluster randomized clinical trial. The theoretical overview integrated the Model of Human Occupation (MOHO), a client-centered occupational therapy (OT) model, with Motivational Interviewing (MI), a client-centered, directive therapeutic approach within work rehabilitation. The cross-sectional study and clinical trial used administrative and clinical databases from the Workers' Compensation Board (WCB) Alberta Millard Health, the occupational rehabilitation facility where the clinical trial took place. Variables included claimant demographic information (i.e. age, sex, disability duration, education, salary, marital

status) and program outcomes (i.e. job attachment status). Participants in these studies were over the age of 18, diagnosed with a MSK disorder without a concurrent diagnosis of a traumatic brain injury (i.e. concussion) or traumatic psychological injury (i.e. assault at work), and participated in a RTW (functional restoration) program at an occupational rehabilitation facility in Alberta, Canada. The statistical analysis for the cross-sectional study validating the Readiness for Return-to-Work (RRTW) scale included exploratory and confirmatory factor analyses, reliability analyses, and correlation with related scales and questionnaires. The statistical analysis for the clinical trial evaluating the effectiveness of motivational interviewing included multivariable logistic regression to obtain the odds ratio for likelihood of RTW at the time of program discharge while adjusting for cluster and potential confounders.

Results: All three papers evaluated factors associated with readiness for RTW. MOHO provides a conceptual framework for understanding an injured worker's decision-making process, while MI can assist in guiding injured workers' decisions and help them transition back to work. This includes progressing through the stages of change and accomplishing tasks required for successful rehabilitation. For the validation study, three factors were identified for a non-job attached/not working group within the Readiness for Return-To-Work (RRTW) scale, which included Contemplation, Prepared for Action- Self-evaluative, and Prepared for Action-Behavioural. For a job attached/working in some capacity group, two factors were identified, Uncertain Maintenance and Proactive Maintenance. Expected relationships and statistically significant differences were found among the identified RTW readiness factors and related constructs of pain, physical and mental health, and RTW expectations. The results of the clinical trial found a statistically significant difference in RTW rates at program discharge for non-job attached injured workers favouring the intervention group over the standard care control group.

A clinically important difference was observed in RTW rates at program discharge for job attached injured workers favouring the intervention group over the standard care control group.

Conclusion: Integrating MOHO and MI provides a comprehensive theory of impairment and RTW change processes. The integration of this model and intervention has the potential to reduce work disability and improve RTW outcomes by encouraging participation of injured workers' in the RTW decision-making process and providing insight into their level or readiness to RTW. This is an important consideration in work rehabilitation as the construct of readiness for RTW can vary by disability duration. Furthermore, physical health appears to be a significant barrier to RRTW for workers who are job attached or currently working while mental health significantly compromises RRTW with the non-job attached/not-working group. Motivational interviewing integrated into work rehabilitation appears to be more effective than routine rehabilitation programs alone in improving RTW rates among unemployed workers. MI could be an important addition to work rehabilitation programs as there are currently few evidence based, non-physical intervention methods to address psychosocial and behavioural barriers to recovery associated with MSK disorders. While this thesis provided some understanding of injured workers' level of readiness to RTW and evaluated an intervention specifically addressing psychosocial and behavioural risk factors associated with work-related MSK disorders, further investigation in this area is required. Future research should consider evaluating stage-based interventions that could assist in increasing RTW rates among injured workers who are at various levels of readiness for RTW.

PREFACE

This thesis is an original work by Joanne Park under the supervision of Dr. Shaniff Esmail, Professor in the Department of Occupational Therapy at the University of Alberta and Dr. Douglas P. Gross, Professor in the Department of Physical Therapy at the University of Alberta. The University of Alberta's Health Research Ethics Board approved the research studies in this thesis (No: Pro00050492, Date: August 20, 2014). The studies in Chapters 4 and 5 are currently under review by the Journal of Occupational Rehabilitation.

DEDICATION

To my husband Chris, thank you for being my greatest support and for never letting me fall during this journey. Your love, patience, and strength gives me the courage to challenge myself and pursue my goals.

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LIST OF SYMBOLS AND ABBREVIATIONS

C - Contemplation
CDN - Canadian
CFA - Confirmatory Factor Analysis
CFI - Comparative Fit Index
DARN - Desires, Abilities, Reasons, Needs
df - Degrees of Freedom
EFA - Exploratory Factor Analysis
MCS - SF-36 Mental Component Summary
MET - Motivational Enhancement Therapy
MI - Motivational Interviewing
MINT - Motivational Interviewing Network of Trainers
MOHO - Model of Human Occupation
MSK - Musculoskeletal
OR- Odds Ratio
OT - Occupational Therapy or Occupational Therapist
OTs - Occupational therapists
PA-B - Prepared for Action- Behavioural
PA-S - Prepared for Action-Self evaluative
PC - Pre-contemplation
PCS - SF-36 Physical Component Summary
PDI - Pain Disability Index
PM - Proactive Maintenance
RMSEA - Root Mean Standard Error of Approximation
RRTW Scale - Readiness for Return-To-Work Scale
RTW - Return-to-Work
RTW Expectations Questionnaire - Return-to-Work Expectations Questionnaire
SF-36 - SF-36v2 Health Survey
UM - Uncertain Maintenance
VAS - Visual Analogue Scale
WCB - Workers' Compensation Board
WEIS - Work Environment Impact Scale
$\mathbf{X^2}$ - Chi Square

Chapter 1

Introduction and Objectives

1.1. Introduction

Review of return-to-work (RTW) literature is extensive and complicated because of the wide range of disorders covered and because determinants of RTW present different risk factors at different times [21]. Although there is an abundance of RTW research, there continues to be discrepancy regarding what defines a successful RTW outcome and further investigation of determinants of RTW is required [17]. RTW is a dynamic and evolving process influenced by temporal, personal and environmental factors, which supports the need for a developmental approach in work rehabilitation [20]. It is widely recognized that psychosocial and behavioral factors associated with work-related musculoskeletal (MSK) disorders contribute to persistent disruptions in the RTW process. While there are many risk factors that influence work disability, this thesis is concerned with psychosocial and behavioural factors associated with MSK disorders.

This thesis examines psychosocial and behavioural factors in work rehabilitation, including: 1) development of a comprehensive theoretical framework that considers injured workers' decision making processes to inform a specific intervention (motivational interviewing) [5, 17]; 2) validation of the Readiness for Return to Work Scale in a work rehabilitation sample [4]; and 3) evaluation of the effectiveness of motivational interviewing to address psychosocial barriers and facilitate behaviour change regarding RTW [5, 17, 19]. Chapter One outlines an introduction to this thesis, provides brief summaries of significant subject matter, provides the

problem statement, and states the specific research objectives. Chapter Two is a literature review of the pertinent topics pertaining to this thesis. Chapter Three discusses a client-centered theoretical framework specifically for work rehabilitation occupational therapists (OTs), and an evidence-based client-centered approach that can address psychosocial issues and behaviour change related to MSK disorders with injured workers. Chapter Four describes a study of the validity of the Readiness for Return-To-Work (RRTW) Scale, determining the utility of this scale within a work rehabilitation setting. Chapter Five describes the primary research study evaluating the effectiveness of Motivational Interviewing (MI) in improving RTW rates with injured workers. Chapter Six provides an overview of significant findings related to this thesis research project with considerations for future research. Findings of this thesis research project are clinically important and have the potential to impact policy and practice in work rehabilitation.

1.2. Work Rehabilitation

In the 1970s, a paradigm shift in treating work related injuries occurred [7]. Traditional work hardening programs using a biomechanical approach now incorporated psychosocial elements with guidance provided by an interdisciplinary team [7, 16]. Work rehabilitation program parameters, philosophies and interventions may vary depending on the specific disciplines involved in service delivery; however, the ultimate goal of all work rehabilitation programs is the RTW of an injured worker [7]. Work rehabilitation programs continuously evolve with programs becoming more inclusive to accommodate consumer needs and the health care environment [7]. Work disability is no longer viewed as merely the absence of illness or impairment but considers the consequences of interactions between the injured worker and three

key systems including health care, work environment and financial compensation systems [13]. This in turn has made it essential for RTW interventions to consider how several interrelated factors (clinical, social, psychological, physical, work environment, stakeholder involvement) can influence the RTW process and outcomes [3].

1.3. Motivational Interviewing

MI is an evidence-based, client-centered, directive therapeutic approach to enhance readiness for change by assisting clients explore and resolve ambivalence [6, 15]. MI has been thought of as an amalgamation of principles and techniques adopted from several models of psychotherapy and behaviour change theory [18]. For example, MI has been considered an evolution of Rogers client-centered therapy where a supportive and empathic approach is used; however, the consciously directive method used to resolve ambivalence in the direction of change sets it apart from other client-centered therapies [6]. MI philosophies of exploring the client's own arguments for change have been associated with Bem's self-perception theory which suggests people are more committed to statements that they hear themselves defend and support [6].

A fundamental goal of MI involves assisting individuals to overcome ambivalence about behaviour change [15, 18] and has been found to be particularly effective with people whose readiness to change is low [6, 18]. The *spirit* of MI is the underlying perspective with how MI should be practiced [14]. It includes collaboration (partnership that honours the client's expertise and perspectives), evocation (resources and motivation for change reside within the client), and autonomy (client's right and capacity for self-direction) [14, 15]. The method of MI consists of four processes that form the flow of the approach [14]. The four processes outlined by Miller and

Rollnick [14] are as follows: (1) Engaging: establishment of a working relationship and helpful connection by both parties; (2) Focusing: clarifying the agenda and direction of change one intends to move; (3) Evoking: eliciting the individual's own motivation for change; and (4) Planning: developing commitment to change and expressing a specific action plan.

1.4. Model of Human Occupation

The Model of Human Occupation (MOHO) is an occupation-based model used to guide occupational therapy (OT) practice [8, 11]. The focus of MOHO is on occupation (meaningful activities) and stresses the importance of client-centered practice reflecting the values and desires of the individual [8]. Occupation focused practice looks beyond impairment reduction and tries to enable individuals to recognize meaningful participation in life occupations [12]. MOHO is concerned with participation and adaption in life occupations and suggests the following: (1) a person's characteristics are linked to the external environment; (2) person characteristics and the environment influence occupation and; (3) a person's inner characteristics (motives, patterns and capacities) are either maintained or changed through the engagement of occupations [8].

1.5. Readiness for Return-to-Work Scale

The Readiness for Return-to-Work (RRTW) scale assesses stages of readiness for RTW and was developed and validated in a Canadian study of workers' compensation claimants experiencing time loss from work for MSK disorders [2, 4]. The two-part scale examines injured workers who are not working, assessing their readiness for RTW and injured workers who are working but are at risk for sickness absence relapse, assessing their readiness for work maintenance [2]. The RRTW scale is simple and short representing specific stages of change

including pre-contemplation, contemplation, prepared for action-self-evaluative and prepared for action-behavioural for individuals who are not working; and uncertain maintenance and proactive maintenance for individuals who are working [2].

1.6. Problem Statement

Clinical practice and academic research have extensively focused on RTW after a work related injury but the ability to anticipate and implement positive RTW outcomes is limited [20]. Incompatible models of RTW are widespread and a comprehensive model of RTW has not yet been articulated, resulting in gaps in RTW theories and practice [4, 17]. In addition, challenges with implementing evidence-based principles in practice have been reported by health care providers, such as Occupational Therapists (OTs) in work rehabilitation [10]. The problem addressed by the first study in this thesis is the evaluation and integration of an OT client-centered theoretical model with a client-centered interventional tool that considers the perspective of the injured worker's decision-making process.

Understanding determinants of optimal RTW has been a focus of work disability research for the past decade [4]. While recent research has recognized the significance of addressing various interconnected factors related to the RTW process, a consistent limitation in RTW research includes the small number of validated self-reported measures of constructs that affect RTW [4]. There is widespread acceptance of the validity of self-rated health instruments and self-perceived health has been consistently linked to functional disability and physical and mental symptoms [9]. In health service research and clinical epidemiology, self-rated health is progressively becoming the standard [1]. The problem addressed by the second study in this

thesis research project is the validation of one of the few self-reported RTW measures available in work rehabilitation research and practice, the Readiness for Return-To-Work (RRTW) scale.

Evidence supporting the importance of psychosocial and behavioural factors associated with work related MSK disorders have encouraged work rehabilitation researchers and practitioners to consider intervention approaches intended to target these factors [19]. Particular research needs for psychosocial and behavioral interventions in RTW include: identifying phase specific risk factors, acknowledging injured workers' readiness for RTW, clear and specific interventions, and skill development and adherence by work rehabilitation providers [4, 17]. The problem addressed by the third and primary study of this thesis is the evaluation of MI in the context of work rehabilitation with injured workers who have a MSK disorder. The significance of this study is that it provides a unique opportunity to evaluate the effectiveness of MI in an unstudied population of injured workers. This could potentially make significant clinical and research contributions in the area of work rehabilitation as there are currently limited assessments and interventions to address psychosocial and behavioural issues associated with MSK disorders.

1.7. Research Objectives

The objectives of this thesis research project were to:

1. Identify an integrated conceptual framework to understand injured worker's decision-making processes, specifically from an OT lens, and evaluate how characteristics of MI can be used in work rehabilitation to address behaviour change regarding RTW.

2. Investigate the construct and concurrent validity of the RRTW Scale in a Canadian occupational rehabilitation sample.

3. Evaluate the effectiveness of MI for increasing RTW rates with injured workers receiving workers' compensation and undergoing work rehabilitation.

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Chapter 2

Literature Review

2.1. Introduction

This chapter reviews significant literature related to this thesis and provides rationale supporting the importance of addressing behaviour change in the return-to-work (RTW) process. Chapter 2 is organized into the following four sections: (a) work disability, specifically related to psychosocial and behavioural factors; (b) occupational therapy (OT) and RTW; (c) readiness for RTW; and (d) motivational interviewing (MI).

2.2. Work Disability

Work disability can result in activity limitation and restriction in participation of life events [41]. Work disability is primarily demonstrated as sickness absence, or short term incapacity [30]; however, injured workers who do not recover within a reasonable timeframe are at risk of chronic work disability [13, 41]. The biopsychosocial model of work disability is widely recognized as the leading conceptual framework to describe and treat work disability related to MSK disorders [36, 41]. Waddell [41] describes the biopsychosocial principles of work-related health management as: "bio" referring to controlling symptoms and improving function through management of the health condition; "psycho" involving minimizing distress and adjusting dysfunctional beliefs and sickness behaviours; and "social" comprised of limiting the sick role.

Work disability research confirms the importance of psychosocial factors as determinants of disability in relation to MSK disorders caused by a work-related injury [37]. Psychosocial factors can affect the psychological and social wellbeing of an injured worker and can also facilitate barriers to successful RTW and rehabilitation [7]. Psychosocial risk factors can include an individuals' predisposition and emotional reactions such as attitudes, beliefs, fear, and distress and/or, relational factors including conflict or insufficient support [36].

2.2.1. Psychosocial and Behavioural Factors

Individual-level psychosocial factors are worker characteristics comprised of psychological, social, and environmental features that influence recovery from illness or injury [41] and are important measures related to RTW and prevention of work disability [7]. An injured worker's beliefs regarding the severity of their musculoskeletal (MSK) disorder is a significant predictor of RTW [7, 34] and the expectations of an injured worker are predictive of work participation and RTW outcomes [7, 16]. Prolonged work disability is associated with low expectations regarding the probability of returning to work [7, 34, 36]. This is further complicated by negative expectations of RTW and feeling unwelcomed when an injured worker has returned to work, as both are associated with long term sick leave [11, 17]. The self-efficacy of an injured worker in their ability to perform work activities is also associated with prolonged work disability and evidence suggests employment increases with an injured worker's confidence in their ability to work [2, 7, 36].

RTW is often conceptualized as an intricate behaviour change with the injured worker ultimately deciding to RTW [6]. Behaviour is not solely determined by intention as it also depends on knowledge, skills, barriers, and facilitators required to realize a certain behaviour [6].

RTW behaviours are influenced by individual-level psychosocial factors. Evidence suggests fear avoidance beliefs are predictive of work outcome [19] and passive or adverse coping mechanisms are predictive of unfavourable disability results [7]. Evidence also indicates poor problem solving skills are related to prolonged disability [7, 34, 36] and there is an association between an injured workers ability to cope and work disability outcome [22]. Behavioural determinants such as work attitude, social support during sickness absence and an injured worker's readiness to put effort into completing a specific behaviour are significantly associated with shorter RTW duration [6]. The impact of psychosocial factors on RTW can fluctuate over time and the strength of association between RTW behaviours and psychosocial factors can vary between various health conditions [7]. In response to the importance of psychosocial factors influencing work disability, there is a movement towards development of intervention programs that specifically address psychosocial risk factors in work rehabilitation [37].

2.3. Occupational Therapy and RTW

Returning to work is an essential component of work rehabilitation for injured workers. Within a work rehabilitation program, the primary goal of an OT involves enabling the injured worker to participate in everyday life activities, including work [12]. OTs work with injured workers, employers, and various stakeholders to improve the injured worker's ability to participate in occupations they want, need, or are expected to do [12, 38]. It is important to note that OTs use the term occupation to describe any meaningful activity and it is not solely used to describe employment, although employment could be an occupation [12]. Descriptive literature and knowledge from experienced practitioners reveal that OTs are increasingly involved in restoring work ability and have an important role in work rehabilitation [12]. OTs provide a wide array of work rehabilitation interventions, in various settings, to numerous injured workers

across the lifespan with different diagnoses [24]; however research surrounding OT approach and intervention in work rehabilitation is limited. This is supported in a recent systematic review that found OT in work rehabilitation does contribute to RTW but it is unclear beyond workplace interventions, what exactly the effective elements of OT are [12]. The results of this systematic review conclude best practice related to OT approach and intervention aimed at RTW is still unclear; however the need to know is both necessary and urgent.

2.4. Readiness for Return-to-Work

Recent evidence recognizing non-medical components of work disability coupled with the view that RTW is influenced by different factors and various times, supports the use of a developmental approach in RTW research and practice [42]. In addition, there is growing evidence supporting phase-specificity of risk factors; in the acute phase, physical and injury factors are determining predictors of disability while in the subacute and chronic phases, psychosocial factors are more predictive of disability [15, 21, 35]. Although it has not yet been widely adopted in work rehabilitation research and practice, there is substantial evidence that a phase-specific approach offers a better understanding of the RTW process [15].

The Readiness for Change model is an evidence-based model that identifies individual and social factors that impact the capacity to initiate and maintain changes in behaviour while conceptualizing the individual's progression through stages of change [14]. Through their research in attempting to understand how people change, Prochaska and DiClemente [31] identified five stages of change: Pre-Contemplation - this stage is characterized by no intention to change behavior; Contemplation – in this stage, individuals acknowledge a problem exists and have put serious thought into overcoming it but there is no commitment to take action;

Preparation – in this stage, while some behavior change has been made, it is not at the level of effective action; Action – this stage is characterized by individuals modifying their behaviours, experiences and environment to overcome their issue; and Maintenance – this stage includes an individual's efforts to prevent relapse by stabilizing the behavior change. The Readiness for Change model proposes that in relation to a behaviour change, individuals progress from one stage of change to another and it is possible for the individual to return to a previous stage of change [14]. For a given behaviour, individuals can be in one of five stages of change which is determined by their decisional balance, self-efficacy and change process [14].

The Readiness for Change Model has been used to address various behaviors, including smoking cessation and drug addiction and has received strong empirical support [32, 40]. It has also been validated with non-addictive behaviours such as pain management and has shown strong predictive validity regarding readiness for self-management of pain [4]. In regards to injury prevention, a stages of change scale has been validated for safety behaviour involving farm work [20]. The Readiness for Change Model has more recently been applied to work disability and addresses motivational factors that contribute to and maintain behaviour change [14]. The following aspects of the Readiness for Change model that complements the relevance of application to behaviours involving RTW include: (1) a model less fixed on individual factors which allows the integration of external aspects and identifies the role of the injured worker in the decision making process (2) attention to temporal features in work disability (3) identification of specific hypotheses and empirical testing concerning relationships among constructs (4) development of stage based interventions personalized to the characteristics of each stage and (5) compatibility with research transfer as it is available to healthcare and insurance providers and human resource personnel [14]. The Readiness for Change model

provides a conceptual framework that can recognize, incorporate and translate information about elements of optimal RTW that comes directly from those involved in the RTW process [14].

2.4.1. Readiness for Return-To-Work Scale

The previous application of the Readiness for Change model to human behaviors led to the development of the Readiness for Return-to-Work (RRTW) scale which assesses stages of readiness for RTW with injured workers [14]. The 22 item measure of the RRTW stages consists of 13 items for individuals who are not working and 9 items for individuals who are working either part time or full time [5]. The scale is scored using a five point scale (1 = strongly disagree, 5 = strongly agree) and the stage of change the individual is in is represented by the highest score associated with a readiness stage [14]. The readiness stages in the RRTW scale were adapted from Prochaska and DiClemente's [31] original five stages of change and include pre-contemplation, contemplation, prepared for action-self-evaluative and prepared for action-behavioural for individuals who are not working; and uncertain maintenance and proactive maintenance for individuals who are working [5]. The RRTW scale was validated in a Norwegian study evaluating a 5-day inpatient occupational rehabilitation program and found the scale has clinical potential and could facilitate more tailored work rehabilitation interventions [5]. This study also found the scale could be used as a screen to guide assessments, for goal-setting purposes, and to assist with decision making in RTW and rehabilitation practice [5].

Instruments in work rehabilitation practice and research are necessary to assess, monitor and evaluate work disability and functioning [1]. While a large quantity of instruments that measure health-related productivity change exits, their methodological quality is uncertain which requires caution when utilizing these instruments in practice [28]. Although the development

and validation of the RRTW scale has shown promise in work rehabilitation research and practice, further validation is required to examine the progression from one stage to another [14] and confirm readiness dimensions in different cultures and patient settings [5].

2.5. Motivational Interviewing

MI was originally used in the area of substance abuse; however, its effectiveness has been found to be much broader and has been applied to medical and behavioural disorders where a change in behaviour is essential in minimizing or eliminating risk and/or harm [8, 18, 25, 33]. Additionally, MI has been associated with positive gains in measures of general well-being, including lower stress and depression levels, suggesting that MI may indirectly increase a client's sense of wellbeing after successful changes to certain areas of their life have been made [25].

A systematic review and meta-analysis by Rubak et al. [33] found MI had a significant and clinically relevant effect on approximately 75% of the studies reviewed (53/72 randomized controlled trails) with no difference in effect noted between physiological (72%) and psychological (75%) diseases. When MI was used in brief encounters (approximately 15 minutes), an effect was found in 64% of the studies and multiple encounters increased the effectiveness of MI [33]. Physicians and psychologists were able to attain an effect in approximately 80% of the studies, in comparison to other healthcare providers who achieved an effect in 46% of the studies reviewed [33]. However, of the reviewed studies, physicians and psychologist provided the intervention in over 90% of the cases while other healthcare providers only completed the intervention in less than 10% of the reviewed studies [33].

A meta-analysis completed by Lundahl et al. [25] evaluated the effectiveness of MI as an intervention and found the effect size of MI is generally small. Effect size refers to the extent of an effect or the strength of an intervention [25] and in meta-analyses, an effect size of 0.20 is considered small but statistically significant, while effect sizes that range from 0.50 to 0.80 are considered moderate to large. [10]

The meta-analysis by Burke et al. [8], specifically reviewed adaptations of MI. The adaptations were generally a feedback based approach that provided the results of standardized assessments (i.e. Drinker's Check-Up). Adapted MI interventions were found to be an effective approach in addressing problem behaviours and yielded a moderate effect size, producing equivalent results compared to other active treatments, for issues including alcohol, drugs, diet and exercise [8]. In addition, using MI as a prelude to treatment was related to better outcomes in substance abuse studies and the effects of MI were found to be long lasting across evaluation periods [8].

The meta-analysis completed by Hettema, Steele & William [18] evaluated the impact of MI across various problem areas. In addition, treatment adherence was reviewed assessing the impact of MI as a singular treatment or as a component of another treatment while also evaluating the effectiveness of MI across providers. The authors reported manual use during the intervention produced a weaker effect compared to no manual use and as follow up times increased the benefits of MI significantly decreased [18].

The systematic review and meta-analysis by McGrane, Galvin & Stokes [26] evaluated the effectiveness of MI interventions in addition to traditional physiotherapy to increase physical activity and adherence to exercise programs. The result of the meta-analysis conclude positive

effects with self-efficacy and activity limitation were achieved with motivational interventions (cognitive behavioural therapy, social cognitive therapy, motivational interviewing, self-determination theory, transtheoretical model, social learning theory); however, not with adherence [26]. While the review supports motivational interventions are effective in increasing behaviors related to healthy physical activity, it is unclear which motivational interventions were most effective.

O'Halloran et al. [29] completed a systematic review and meta-analysis to determine if MI contributes to improved physical activity, cardiorespiratory fitness or functional exercise capacity for individuals with chronic health conditions. The results of the meta-analysis indicate MI has a small positive effect on physical activity among individuals with chronic health conditions but the effect of MI on cardiorespiratory fitness and functional exercise capacity are inconclusive [29]. An explanation for the small effect size was attributed to variation in treatment fidelity across the evaluated studies [29]. Among the reviewed literature examining physical activity, treatment fidelity was not confirmed leading to questions regarding whether participants were indeed receiving MI and if the intervention was delivered in the manner the study intended [29]. In addition, several of the studies targeted multiple health behaviours which is inconsistent with the focusing process of MI as only one target behavior per MI session is recommended. Targeting multiple behaviours may overwhelm the client and focus on the intended outcome may become less urgent and of less importance. This is consistent with the systematic review and meta-analysis by Armstrong et al. [3] evaluating MI to improve weight loss in overweight and/or obese patients who found that targeting multiple behaviours resulted in weight management becoming less of a priority.

Of the reviewed meta-analyses, only a one discussed readiness for change. Vasilaki, Hosier & Cox [39] reviewed two studies that examined readiness for change and found brief MI was more efficacious compared to skill based counseling for individuals who are at a low readiness for change [39]. Vasilaki et al. [39] reported the focus of future studies of MI should include possible predictors of efficacy including mental health, readiness to change, and employment status.

The current literature provides evidence that MI can be used as a practical and effective intervention for a variety of medical and behavioural disorders. The reviewed literature supports MI generally produces a low to moderate effect size; however differences between the meta-analysis highlighted diminishing effects of MI over time and several moderating variables including the number of sessions, format of treatment, and variations of the samples [25]. Of the reviewed literature on MI, only one study by Butterworth et al. [9] involved health coaching in a work related setting. In addition, only one MI study by Navidian et al. [27] evaluated the effect of safety education with workers using MI group interviewing. None of the literature reviewed to date have evaluated MI with injured workers in a work rehabilitation setting.

2.6. Literature Summary

This review offers a summary of significant factors related to behaviour change in the RTW process and potential areas of research that warrant attention in work rehabilitation. The literature review emphasized the following:

(a) Although it is well known that psychosocial and behavioural factors related to MSK disorders significantly impact the RTW process, there continue to be limited approaches available in work rehabilitation to address this.

(b) The involvement of OTs in work rehabilitation is extensive but best-practice standards still need to be agreed upon and evaluated.

(c) While assessment of an injured workers' readiness to RTW would be a critical first step in knowing prior to providing appropriate work rehabilitation interventions, little research in this area currently exists [23].

(d) MI is a well-researched approach used to address many maladaptive and adaptive behaviours; however, it has not yet been applied to injured workers in the compensation system undergoing rehabilitation.

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Chapter 3

Model of Human Occupation and Motivational Interviewing Compliments Occupational Therapy Practice in Vocational Rehabilitation

ABSTRACT

Background: Standards of best practice significantly challenge occupational therapists (OTs) in vocational rehabilitation, as current practice is not strongly grounded in theory, occupation, or evidence. In addition, a conceptual framework is needed to understand injured worker's decision making and inform evidence-based interventions to address behaviour change regarding RTW. The Model of Human Occupation (MOHO) is an occupation-based model used to guide occupational therapy (OT) practice. The model integrates concepts related to the person's characteristics with their environment to explain participation in occupation. It has the potential to assist in understanding how an injured worker's internal characteristics can generate behaviour change. Motivational Interviewing (MI) is an evidence-based, client-centered approach that has been efficacious in reducing maladaptive behaviours and promoting adaptive behaviours in a broad range of situations where behaviour change is the focus. If integrated, MOHO and MI could provide the means to understand and facilitate RTW change processes in vocational rehabilitation.

Objective: This paper provides an overview of MOHO and MI in vocational rehabilitation without structured methodology. The objectives of this paper are to: (1) Evaluate MOHO as a framework for supporting OTs in vocational rehabilitation; (2) Assess MI as a suitable approach for OTs in vocational rehabilitation; and (3) Compare and integrate MOHO and MI.

Practice Implications: OTs in vocational rehabilitation are challenged with linking evidence-based tools to specific practice models supporting client-centered beliefs and practice. MOHO provides a conceptual framework for understanding an injured worker's decision-making process, while MI can assist in guiding injured workers' decisions and help them transition back to work. This includes progressing through the stages of change and accomplishing tasks required for successful rehabilitation.

Conclusions: Integrating MOHO and MI provides a comprehensive theory of impairment and RTW change processes that have the potential to reduce work disability and improve RTW outcomes. In addition, the integration of MOHO and MI can have significant implications for OT practice in vocational rehabilitation. MI is a cross-disciplinary intervention that may effectively bring about meaningful change in vocational rehabilitation practice.

3.1. Introduction

Vocational rehabilitation is a growing field of research and practice that has contributed to significant developments towards understanding the return-to-work (RTW) process and facilitating RTW outcomes. However, the implementation of study results has been modest with only minor changes to overall work disability rates [29, 37]. This has been, at least in part, attributed to a lack of a comprehensive theoretical framework addressing work disability and RTW. This is further complicated by a substantial gap between theories and models used by researchers and front-line vocational rehabilitation practitioners [10, 16, 29]. In addition, there are limited intervention approaches in vocational rehabilitation for ensuring effective and meaningful behaviour change [10, 29]. There is a need for an integrated conceptual framework to understand injured workers' decision making processes and inform evidence-based interventions that address behaviour change regarding RTW [10, 29].

Vocational rehabilitation is an important practice area in occupational therapy (OT) and those in the area are expected to practice in a manner that is theory-informed, evidence-based, and occupation-focused [18]. However, this standard of best practice significantly presents a challenge, as current practice is not strongly grounded in theory, occupation, or evidence [18]. Furthermore, occupational therapists (OTs) are challenged with linking evidence-based tools with specific conceptual models that support client-centered beliefs and practice.

This paper is an overview of the Model of Human Occupation (MOHO) and Motivational Interviewing (MI) in vocational rehabilitation without structured methodology. The objectives of this paper are to: (1) Evaluate MOHO as a framework for supporting OTs in vocational

rehabilitation; (2) Assess MI as a suitable approach for OTs in vocational rehabilitation; and (3) Compare and integrate MOHO and MI.

3.2. Model of Human Occupation and Vocational Rehabilitation

Conceptual models offer insight into issues faced by clients and provide explanations, evidence, and resources necessary for best practice [13]. The Readiness for Change Model has been applied to vocational rehabilitation and use the stages of change originally described by Prochaska et al. [30] as a framework for describing the change process. The five stages of behavioural change were related to RTW by Franche et al [9] and described as: (1) Precontemplation - Injured workers absent from work are not considering or initiating behaviours associated with RTW; (2) Contemplation - Injured workers are ambivalent about RTW; (3) Preparation - Injured workers seek information about RTW, test their abilities to RTW, and make tangible RTW plans; (4) Action - Injured workers have put their RTW plan into action and are working in some capacity; and (5) Maintenance - Injured workers use skills and support systems to manage situations or behaviours that can interfere with RTW.

Like the Readiness for Change Model, the MOHO provides deeper understanding of an individual's motivation for change that can fluctuate depending on the readiness stage of the injured worker. MOHO is an occupation-based model used to guide OT practice [13]. MOHO provides a broad and integrative view of occupation that attempts to explain how human occupation is motivated, patterned, and performed [12]. Evidence indicates MOHO is the most extensively used occupation-based model among OTs worldwide and has also been previously been applied to vocational rehabilitation to guide interventions and programs [18, 19]. MOHO describes how work behaviour and occupations are the result of interactions between concepts

related to person characteristics (volition, habituation, and performance capacity) and the environment [18].

OT conceptual models provide concepts and facts which help guide therapists' understanding of a clients' thoughts, emotions, experiences, choices, capacities, and behaviours [13]. A fundamental goal of OT is enabling clients through engagement in meaningful occupation [34]. To OTs, occupation refers to tasks or activities involved in everyday life that give meaning and value to individuals and their culture [35]. The identification of a model that can support OT practice in vocational rehabilitation can enhance professional identity and competence and also assist OTs meet standards of best practice. In comparison to other OT models, the MOHO was chosen for review and integration with MI in vocational rehabilitation because it provides a profound understanding of why occupation is performed.

3.2.1. Volition

Two important works, Kielhofner [13] and Kielhofner et al. [14], informed many of the ideas in this section. OT based on MOHO requires identifying and addressing an individual's volitional issues. Volition is described as the process through which individuals find meaning, which motivates them to select activities in which they want to participate. Volition is shaped by thoughts and feelings that reflect a person's values (beliefs about what is important to do, how to perform occupations, and what to commit to), interests (experience of pleasure and fulfilment in occupation), and personal causation (beliefs about one's capacities and effectiveness). MOHO stresses that volition is fundamental to OT practice, as the therapy process requires clients to make decisions about occupations, which then influence therapy outcomes. Volition factors such as job satisfaction and personal causation are essential to the decision-making process in RTW

and the ability to succeed at work [18]. Injured workers who see work as a strong social value necessary to be independent and improve life circumstances may be more compelled to RTW. However, this value may be influenced by culture, and not everyone values work to the same degree or in the same way. Vocational interests significantly influence the type of work people choose. Individuals who enjoy and are interested in their work have a greater investment and attraction for work compared to individuals whose work circumstances provide little opportunity for enjoyment and satisfaction. Negative work circumstances can, therefore, negatively affect desire for work. Personal causation is also an important consideration for injured workers when selecting a position to return to or potential career opportunities. An injured worker's accurate understanding of their personal capacity and self-efficacy will assist them in correctly using their skills and abilities to select work at which they will succeed.

3.2.2. Habituation

Habituation is another concept in MOHO that refers to the organization of actions into patterns and routines that are governed by habits and roles, and shaped by context and the environment. Habits operate differently within various environmental contexts, which influences how individuals perform routine activities and behave within these contexts. Roles are the functions assumed by individuals and the internalization of roles is a process that provides individuals with an identity. A sense of obligation that accompanies that identity subsequently influences behaviour in order to fulfil the role requirements that are shaped by social systems. The recurrent patterns of work behaviour that make up an abundant portion of work are the result of an internalized worker role and habits. Barriers to RTW can arise from long term disruption to an individual's work role and habits, while previous work history and an ability to identify and

re-adopt work role expectations support RTW success [18]. Competent work behaviour results from successful integration by the worker of the norms, behaviours, and rhythms inherent to the workplace. Furthermore, workers need to understand their worker role and, at times, must be able to transfer this understanding across different work environments. When applying MOHO, an essential task of therapy involves constructing or reconstructing habits and roles that have been impacted by impairments or environmental circumstances to allow the individual to readily participate in routine occupations such as work.

3.2.3. Performance Capacity

Performance capacity is influenced by an individual's underlying physical and mental abilities as well as how these are used and experienced [13]. Performance capacity considered alongside of habituation and volition provides a broader view of the worker's behaviour. Personal causation, interests, values, roles, and habits can all be impacted when an injured worker experiences changes to performance capacity. In addition, permanent disruptions in capacity often require changes to one or more elements of volition and/or habituation for the worker to successfully adapt to the disruption. Changes to performance capacity, therefore, often require recruitment of volition and habituation. For example, if an injured worker believes they cannot functionally use an extremity or fears an increase in pain or re-injury if they attempt movement, the worker may choose to limit movement of the extremity. This results in maintenance or exacerbation of their capacity limitation. In this circumstance, changes to volition and habituation are essential to attain changes in performance capacity. MOHO emphasizes the significance of acknowledging the experience of performance, specifically, the

experience of being limited in performance. It also asserts that attention should be placed on how individuals experience impairment.

3.2.4. Environment

From a MOHO perspective, the environment can significantly impact occupational behaviour. Motivation, organization, and occupational performance are influenced by the environment, which includes contextual characteristics such as physical, social, cultural, economic, and political features. Several dimensions of the environment can influence behaviour and how individuals think and feel about their behaviour. While a lack of environmental support and perceptions of the work environment can negatively affect work success [18], it is rarely one single factor that accounts for success or failure of work. MOHO postulates that the environment and inner characteristics of a person are connected and together influence occupational behaviour.

3.2.5. MOHO Summary

MOHO is capable of addressing broad issues that influence work ability, a variety of impairments, and can be used with a wide range of individuals throughout the life course in various settings [13]. MOHO appears to be a useful model for use in vocational rehabilitation, and could work in conjunction with existing RTW models. Such an integrated model could provide OTs with a framework to explain participation in occupational behaviour. The following aspects of MOHO support its application to vocational rehabilitation: (1) It is an occupation-based theory that can guide practice; (2) MOHO has previously been used to guide vocational rehabilitation intervention and programs; (3) MOHO considers the importance of environment

and how context can influence behaviour and occupation; (4) MOHO provides a broad and integrated approach for working with the complex needs of injured workers; and (5) MOHO is a client-centered theoretical model that can help bridge the gap between client-centered philosophy and practice.

3.3. Motivational Interviewing and Vocational Rehabilitation

3.3.1. Client-centered Practice

Client-centered practice is central to OT philosophy and practice which is reflected within the professional standards of the profession [22]. Client-centered practice emphasizes the importance of autonomy, recognizing the clients' right and capacity for self-direction and collaboration, a partnership that honors the client's expertise and perspectives. MI is a directive, client-centered, evidenced-based approach that elicits behavioural change by assisting clients resolve ambivalence [26]. Client-centeredness is fundamental to both MOHO and MI and the integrated use of this model and intervention can support client-centered beliefs and practice in vocational rehabilitation.

3.3.2. Psychosocial and Behavioral Barriers to RTW

Although the role of OTs in vocational rehabilitation settings can vary, a broad and integrated approach such as MOHO requires the acknowledgement of all aspects of RTW including physical, psychological, and social factors that may contribute to ambivalence in the RTW process. For OTs working with injured workers who are ambivalent about RTW, this can be a challenge, as an evidence-based, formalized approach has not yet been established. Evidence suggests work disability and the RTW process should be conceptualised into

developmental stages that are influenced not just by physical factors but also by psychological and social factors that can create uncertainty in the RTW process [13, 21]. There is an increasing emphasis in vocational rehabilitation on how psychosocial factors contribute to prolonged work disability; however, further research is needed on practical approaches and interventions that address psychosocial and behavioral barriers to RTW [17, 36]. MI has proven to be a versatile treatment in other practice areas, capable of supporting behaviour change in a variety of health conditions and lifestyle problems [21, 32]. The clinical procedure of MI involves a conversation about change with the primary purpose of strengthening the client's own motivation for change based on their values and interests [11, 24, 26].

3.3.3 MI and Stages of Change

MI is typically discussed in the context of the stages of change used in the Readiness for Change Model as described above [9]. The stages of change in the Readiness for Change Model provide a framework for understanding the process of behavioural change as a representation of an individual's level of readiness for change, while MI provides the means to facilitate the change process [2, 25]. These stages are influenced by the inner characteristics of a person as well as the environmental context as described in MOHO, which explains their influence on participation in occupational behaviour. For example, individuals with a strong worker role identity are more likely to invest effort and time into work but an injured worker in the Pre-contemplation stage may not identify strongly with the worker role and find little reason to RTW. Furthermore, for most working adults, competence is determined by one's capacity for and efficacy at work [14]. Injured workers in the Contemplation stage may be struggling with their personal causation, comprised of both personal capacity and sense of self-efficacy, which

results in ambivalence regarding their ability to RTW. Performance capacity influences work adaptation and injured workers in the Preparation stage may start to test their physical and mental abilities and to prepare for RTW. In the Action and Maintenance stages, integration of the person's inner characteristics and the environment are of critical importance as the injured worker has returned to work. Injured workers who feel valued, supported, and rewarded for their efforts have more incentive to continue working [14].

Although it is not necessary to allocate individuals to a specific stage of change when engaging in MI, it may be beneficial to understand the client's level of readiness to adjust the intervention approach and more fully meet the client at their current stage of change [11]. For example, if an OT knows that an injured worker is in the Contemplation stage, they may focus on exploring ambivalence in contrast to an injured worker who is in the Action phase where MI may be less useful and even counterproductive [11]. A tool informing what stage of change the injured worker is in could help OTs meet injured workers at their level of readiness in the change process. A tool based on the stages of change, such as the Readiness for Return-to-Work Scale, should be evaluated within vocational rehabilitation settings to determine its function and applicability during MI.

3.3.4. Summary of MOHO and MI in Vocational Rehabilitation

The integration of MOHO and MI may provide OTs in vocational rehabilitation with a framework to better understand an injured workers' decision making process and an approach that can facilitate participation in occupational behaviour. In order for occupational behaviour change to occur by means of MI, an understanding of the injured worker's volition is necessary to evoke behaviour change. The injured worker's perception of how their performance capacity

has been affected by the work injury and how they can overcome this will help guide practice. This, in turn, will assist with the reconstruction of the worker role and habits and ensure commitment to the occupational behaviour change.

3.4. Characteristics of MI

MI has been examined across an extensive range of target behaviours and has been found to be effective in reducing maladaptive behaviours such as alcohol abuse, drug addiction and smoking and in promoting health behaviour change such as weight loss and increasing physical activity [27, 32]. The applicability of MI across a variety of issues, its brief and specific interactions, and practical use in combination with other active treatment methods has intrigued many health care practitioners and lead to explorations of the utility of MI in other areas of health care practice [27]. Although there are limited studies to date that have examined MI with injured workers, characteristics of MI techniques that complement its suitability for use in vocational rehabilitation programs focussing on behavioural change include: (1) its effectiveness with clients who are ambivalent or reluctant in changing their behaviour; (2) it is efficacious even in small treatment quantities; (3) it can be applied across age, sex, cultural and socioeconomic statuses; and (4) it fits well in combination with conventional interventions and programs [4,11]. Each of these will be discussed in more detail below.

3.4.1 Difficult, Reluctant and Ambivalent Clients

MI appears to be particularly helpful with clients who are angry, oppositional, less motivated, or reluctant/not ready for change [11]. Injured workers who experience complications with the compensation system are often left feeling frustrated, which can interfere with

rehabilitation and the RTW process [6]. For these workers, action-oriented approaches aimed at behaviour change will likely evoke resistance [11]. This can be further exacerbated if the practicing therapist is also confrontational [20]. Arguing against resistance is seen as counterproductive in MI and evokes defense of counter change arguments undermining behaviour change [27]. One of the principles of MI is to refrain from actively opposing the client's resistance and instead to go along with it using reflective listening skills to engage the individual in the problem-solving process [24]. Expressing empathy in MI involves reflective listening, or accurate empathy as defined by Carl Rogers [3]. Essential to the principle of accurate empathy is a client-centred approach which provides a supportive atmosphere and where ambivalence or reluctance is viewed as a normal human experience rather than as pathology [3]. In OT, health is viewed as more than an absence of disease and is understood as having personal dimensions influenced by the things people do in everyday life [35]. The role of the OT in providing a supportive and empathetic environment is consistent with a client-centered approach that honours autonomy and allows the injured worker to choose if, when, and how to change [11]. Autonomy is valued in MI and OT practice. In MI, the role of the practitioner is not to provide all the answers but to instead recognize the client has important insight and is capable of finding solutions to his or her problems. OTs believe that people have the right and capacity to make decisions about their life and the right to informed choice [35]. Resistance in MI is seen as an interpersonal phenomenon rather than an individual struggle, and can be used to create a new approach toward change [24]. When resistance to change is expressed by an injured worker, it can act as a cue for the OT to respond differently, [3] as efforts to force resolution in a specific direction, through persuasion or punishment, can be counterproductive and strengthen the behaviours intended to be diminished [24].

Evidence from studies on addictive behaviours, health behaviours, and treatment adherence shows that MI is most beneficial with individuals who are less prepared to change or those in the Pre-contemplation and Contemplation stages [11]. In most vocational rehabilitation settings, the injured worker is expected to function at the Action stage regardless of what stage they are actually in. This can increase conflict and minimize participation in rehabilitation and the RTW process [11, 17]. From a transtheoretical perspective, this occurs due to a misalignment in the stages of change between the therapist and injured worker and can be a source of frustration and resistance [11]. MI is intended to identify and resolve ambivalence in a particular direction of change; however, the focus is on the interests and concerns of the individual with commitment to change facilitated by eliciting the individual's intrinsic motivation for change [24, 26]. Evoking an individual's intrinsic motivation for change is enhanced by drawing on the client's perceptions, goals and values which are used in both MI and OT [24]. Eliciting change talk (identifying an individual's desires, abilities, reasons, and/or needs for change) to bring about constructive behaviour change is specific to MI and adopting strategies to elicit change talk may provide an approach that is more consistent with the values and beliefs of OT practice than current vocational rehabilitation methods used to bring about change. This may have important implications for injured workers who struggle with repeated disability episodes, or who feel as though they were forced back to work before they were ready. Repeated disability episodes may cause an injured worker to further withdraw from the workplace, leading to more barriers to sustainable RTW [28].

In both MI and OT practice, the client is viewed as the expert of their situation with the partnership respecting the perspective of the client. Increasing importance for change from the client's perspective by creating conflict through the exploration of discrepancy is an essential

goal of MI [3]. Conflict is an important concept in several psychological theories and has the potential to increase ambivalence when an individual struggles between indulging in and resisting the behaviour [24]. In MI, ambivalence is addressed with specific questions and reflections used by the practitioner to create a discrepancy between the client's problem behaviour and personal values. While creating discrepancy is not a typical clinical practice in OT, fostering awareness of troubling behaviour is. Often OTs will encourage clients to consider the perceived benefits and disadvantages of a particular course of action to help a client realize when their occupation and behaviour conflict with their personal goals in hopes that this will bring about change.

3.4.2. Efficacious in Small Doses

Workers' compensation issues can negatively impact an injured worker's self-efficacy [10]. MI attempts to enhance the confidence of the individual in their ability to cope with obstacles to successfully change and maintain that change [3]. Readiness for change is thought to be related to two factors: the level of importance attributed to the change for the client and their confidence in successfully creating the change [24].The client's confidence, also known as self-efficacy, is a pivotal component in motivation and a good indication of treatment outcome [3]. Occupations organize behaviour and enable expressions and management of self-identify, increasing self-efficacy and social connectedness [35], which are important in a client's ability to move through the various stages of change and maintain intended behaviours. Compensation issues and delays coupled with prolonged vocational interventions can negatively affect an injured worker's role identity and self-efficacy, thus impacting their ability to RTW. MI's brief and specific interactions may be of practical use in these situations.

Behaviour change that occurs during treatment generally takes place within the first few sessions of MI [24]. However, recent research on MI evaluating a wide range of problem behaviours including substance use, risky behaviours and participation in treatment suggests there is a dose effect where more sessions are likely to generate more behavioural change [21]. In a meta-analysis completed by Rubak et al. [32] MI interventions were used with various target behaviours including alcohol abuse, psychiatric diagnoses, addiction, smoking cessation and physiological problems. One MI session showed an effect in 40% of the studies; however, with five or more encounters, 87% of the studies demonstrated an effect [32]. Therefore, while one MI session can produce an effect, the likelihood of an effect increased significantly with a higher number of sessions completed [32]. In addition, strength in commitment language (commitment, activation, taking steps), is associated with behaviour change; therefore the quality of MI sessions to evoke commitment language is essential to behaviour change [1]. Across a growing range of disease and problem areas, MI generally produces a small to medium effect in improving health-related outcomes with the effects of MI shown to be durable up to at least one year post treatment [11, 21].

3.4.3. Applicable across Gender, Age and Cultural Boundaries

MI is equally effective with male and female clients and across a wide range of ages where it has been successfully used with adolescents, adults and the elderly [21]. However, since MI is a cognitively based intervention that requires a level of formal and abstract reasoning, it is likely not applicable to those that are very young or anyone who has a severe cognitive impairment [21]. Therefore, while MI could successfully be applied to the majority of injured workers, it may not be appropriate for injured workers who have a severe brain injury or

are managing a traumatic psychological injury. In addition, some studies have found MI to be particularly effective with individuals from certain ethnic minority groups [11, 21]. The non-confrontational, supportive and client-centered approach used in MI may represent a more respectful rehabilitation approach which is more consistent and relatable to some ethnic groups [21].

MI effectively draws from a range of theories and lines of research to describe why and how it works and has been shown to be effective across a spectrum of lifestyle problems and diseases [21]. A key distinction between MI and many clinical approaches is that regardless of what problem areas are addressed, it will not work well if considered a technical approach that is applied to clients [8]. Instead, MI should be considered a way of "being" with clients where MI is done for and with them [26]. Like many professions, OT is dynamic and has evolved; however, this evolution sometimes leaves gaps between theory and practice. MI is a useful clinical skill that lends itself well to OT practice because the client-centered collaborative approach honouring the client's autonomy is consistent with the beliefs of a client-centred partnership valued in OT practice. In addition, the consciously directive method of MI, aimed at resolving ambivalence, allows for interventions to be directed towards change.

3.4.4. Integration with Other Treatment Approaches

MI has demonstrated to be an effective clinical tool on its own or in addition to other evidence-based methods when used with clients where ambivalence and motivation are obstacles to change [21, 27]. When MI is used as a prelude to treatment, its effects have proven to endure across time, suggesting a synergistic effect of MI with other treatments [11].The clinical style of MI has also been used with feedback from structured assessments which is known as

Motivational Enhancement Therapy (MET) [25]. While feedback from structured assessments are useful, this is not inherent or an essential component of MI [25]. Although MET has been successfully used with substance abuse populations, it is unknown whether problem feedback from structured assessments is a valuable addition beyond this population. For example, it is unknown whether giving a depressed injured worker the results of a mood screening test in addition to their active physical treatment would lead to more or less psychosocial barriers affecting rehabilitation outcomes and RTW. Until the benefits of MET can be generalized to the injured worker population, another possibility of using MI with injured workers could be throughout the treatment process as ambivalence does not vanish just because an active treatment such as community physical therapy or a work conditioning program has started [24]. New motivational challenges may develop during the process of rehabilitation with injured workers, especially as more difficult phases of the treatment process are reached, such as immediately before discharge from community therapy or a work conditioning program [27]. During these times, returning to MI strategies may help resolve any new issues that occur [24].

The outcome of several studies using MI with a range of physiological and psychological conditions have concluded that clients who receive MI at the commencement of treatment are more likely to remain in treatment longer, adhere to treatment recommendations, and experience significantly better outcomes compared to clients who received the same treatment but without MI [11, 20, 21, 24]. Therefore, MI in conjunction with standard vocational rehabilitation services may produce better RTW outcomes with injured workers. In addition, MI has also shown to increase the probability that individuals will return for further treatment [24]. This could increase the opportunity for ambivalent injured workers to receive additional services needed for pursuing sustained behaviour change. This is an important consideration for OTs working with injured

workers who are often reluctant about beginning or continuing to participate in vocational rehabilitation programs.

When compared to other evidence-based treatments, such as cognitive behavioural therapy, MI effects were found to be equivalent to these methods [11, 21]. The primary advantage of MI over comparable alternative treatments is the shorter duration of care required to achieve successful results [21]. Therefore, the equivalent success rates but shorter time commitment of MI compared to other evidence-based therapies may make it a more cost effective and practical approach for OTs to address ambivalence with injured workers [21].

3.5. Integrating Person Characteristics of MOHO with MI in Vocational Rehabilitation

The person characteristics described in MOHO are related to key elements of MI to explain how characteristics of this model and intervention can impact RTW change processes in vocational rehabilitation. See Table 3.1.

3.5.1. Personal Causation and Self-efficacy

Personal causation and self-efficacy are both concerned with an individual's perception of their ability to complete tasks. These are important to the RTW process as an injured worker's belief in their abilities to complete work tasks effectively is a significant predictor or RTW [16] and higher personal causation is found among those who RTW compared to those that do not [7].

3.5.2. Values and Eliciting Change Talk

Beliefs about what occupations an individual considers important to do are associated with their values. A sense of worth and belonging encourages engagement in activities that support an injured worker's values [13]. If career values are compromised through the process of managing a work related injury, this can significantly impact decision making in returning to work [18]. In MI, behavioural change begins with eliciting change talk which is any expressed language favoring change. Evidence supports individuals are more willing to accept and act on self-motivational statements [31]. Therefore, eliciting an injured worker's desires, abilities, reasons, and needs (DARN) will evoke an injured worker's intrinsic motivation to generate change focusing on their values in why they should RTW.

3.5.3. Interests and Client-centered Practice

Vocational interests can influence the type of work in which a person chooses to engage in. However, if changes to the work environment and/or position due to a work related injury remove a worker from what they find interesting, pleasurable or satisfying, this can affect their decision to RTW [33]. The ability to pick and engage in work that one enjoys, whether it be for the physical aspects of the position, the intellectual stimulation, or social reasons, are often why one finds work satisfying. Client-centered practice is a key element of MOHO and MI and emphasizes the client is the focal point and is capable of exploring and resolving their own problems. Often in vocational rehabilitation, the client is directed what they should do in order to RTW, rather than focusing on what the client believes is important for them to do to RTW. Essential to client-centered practice in MI is autonomy, and high work autonomy facilitates work

functioning [5]. Therefore focusing on aspects of RTW that the injured worker selects will encourage interest in work and participation in occupational behaviour.

3.5.4. Habits and Creating Discrepancy

Habits shape occupational behaviour by influencing performance in routine activities, regulating how time is used, and creating styles of behaviour [14]. Habits involve learned ways of completing activities; however, disruption to occupational habits, which guide most work related behaviours, can establish new habits that may be maladaptive and possibly harmful to the injured worker. Habituation after a work related injury is essential in determining future work potential [23] as appropriate organization of actions into patterns and routines is required to resume effective work habits. Increasing importance for change from the client's perspective by creating conflict through the exploration of discrepancy is an essential goal of MI [3] and of significant importance when an injured worker is unable to overcome maladaptive or harmful occupational behaviours. Creating discrepancy between an injured worker's occupational behaviours and occupational goals is fundamental in driving motivation for change.

3.5.5. Roles and Commitment Language

Roles shape identity and work can be an important part of an individual's identity. A work-related injury or disability can significantly impact the worker role and long term work role disruption is a barrier to work success [14]. In addition, changes to the worker role for workers who were committed to work before their injury can cause substantial internal struggle and external discord with supervisors or co-workers. The more an individual's identity is defined by the worker role, the more essential it is for that individual to work [14]. However, when the

worker role identity is altered due to a work injury or illness, ambivalence about returning to work and commitment to the worker role may change. Resolution of ambivalence is essential to the efficacy of MI and commitment language (language describing an individual's pledge to commitment, activation, or taking steps to change) in MI directly predict behaviour change [1]. The public nature of verbal commitments, reward of committing to and achieving obligations, or consequences of not meeting an obligation are reasons an injured worker may carefully choose the strength of their commitment language during MI to match their intentions after the MI session is completed [1]. Therefore, the incorporation of MI in vocational rehabilitation should focus on the strength of commitment language which can inform vocational rehabilitation practitioners of the intended level of occupational behaviour change. This in turn can provide valuable information regarding the injured worker's level of readiness to change and the level of disruption to the worker role.

3.5.6. Performance Capacity and Directive in Approach

Performance capacity includes the underlying physical and mental abilities of an individual and how these are applied and understood in performance. A work related injury can cause limitations with motor, process and communication/interaction skills which are barriers to work [18]. In addition, work-related injuries affecting performance capacity may result in anger and resistance of an injured worker who believes steps could have been implemented to prevent the injury or for those who experience complications in the RTW process and believe treatment/intervention could have come sooner. Injured workers who have sustained cognitive and/or physical injuries impacting their performance capacity may struggle with reasonable expectations regarding successful RTW. Some workers may underestimate the impact of injury

to their capacities while others may overestimate the severity incurred. Both possibilities could lead an injured worker to inaccurately recognize reasonable expectations for returning to work and result in participation of occupational behaviours preventing a successful RTW. More often, work related injuries that affect a worker's capacities result in uncertainty of what an injured worker can and cannot do resulting in ambivalence regarding RTW and participation in occupational behaviours. While MI believes resolving ambivalence and change is the decision of the client, it is different from other client-centered therapies because it is directive and goal oriented [31]. MI is an appropriate approach when there is a clear and desired direction for change [11]. The use of MI in vocational rehabilitation may be especially effective for injured workers who are unsure about their capacities and abilities to RTW because vocational rehabilitation is directive with a focus on RTW.

3.6. Conclusion

Integrating MOHO and MI provides a comprehensive theory of impairment and RTW change processes that have the potential to reduce work disability and improve RTW outcomes. Success of client-centered practice is reliant on two components: (1) the clients' desire and ability to participate in the decision making processes and (2) the inclusion of the client in the decision making process [22]. Evidence suggests there may be a perceptual gap between these two components resulting in recommendations for OTs to implement a systematic approach involving clients in the decision-making processes of their goals and services [22]. The integration of MOHO and MI provides vocational rehabilitation OTs with three important implications for their practice: (1) a bridge that can close the gap between the participation and inclusion of injured workers in their decision making processes in vocational rehabilitation; (2)

the linking of a client- centered model with a client-centered intervention approach; and (3) the evaluation of a theoretical framework and intervention that is theory informed, grounded in evidence and occupation focused.

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3.8. Tables

Table 3.1: Characteristics of MOHO and MI Applied to Vocational Rehabilitation

Table 3.1: Characteristics of MOHO and MI Applied to Vocational Rehabilitation

MOHO	MI	Vocational Rehabilitation
Volition • Personal Causation	• Self-efficacy	• Significantly higher personal causation among those who RTW compared to those that do not [7] • Self-efficacy is a significant predictor of RTW [16]
• Values	• Eliciting Change Talk Desires, Abilities, Reasons, Needs	• Career values vital to decision making regarding RTW [18] • Individuals are more willing to accept and act on self-motivational statements [31]
• Interests	• Client-centered	• Volition factors such as interest affects RTW decisions [33] • High work autonomy facilitates work functioning [5]
Habituation • Habits	• Creating discrepancy	• Habituation is essential in determining future work potential [23] • Creating conflict through exploration of discrepancy increases importance for change [3]
• Roles	• Commitment language Commitment, Activation, Taking Steps	• Long term work role disruption is a barrier to work success [14] • Commitment directly predicts behaviour change [1]
Performance Capacity • Cognitive and Physical Skills	• Directive in approach	• Limited motor, process and communication/interaction skills are barriers to work [18] • MI is an appropriate approach when there is a clear and desired direction for change [11]

Chapter 4

Validation of the Readiness for Return-To-Work Scale in Outpatient Occupational Rehabilitation in Canada*1*

ABSTRACT

Purpose: To examine construct and concurrent validity of the Readiness for Return-To-Work (RRTW) scale with injured workers participating in an outpatient occupational rehabilitation program.

Methods: Lost-time claimants (n=389) with sub-acute or chronic musculoskeletal (MSK) disorders completed the RRTW scale on their first day of their occupational rehabilitation program. Statistical analysis included exploratory and confirmatory factor analyses of the readiness items, reliability analyses, and correlation with related scales and questionnaires.

Results: For claimants in the non-job attached/not working group (n=165), three factors were found (1) Contemplation (2) Prepared for Action- Self-evaluative and (3) Prepared for Action-Behavioural. The precontemplation stage was not identified within this sample of injured workers. For claimants who were job attached/working group in some capacity (n=224), two factors were identified (1) Uncertain Maintenance and (2) Proactive Maintenance. Expected relationships and statistically significant differences were found among the identified return-to-work (RTW) readiness factors and related constructs of pain, physical and mental health and RTW expectations.

Conclusion: Construct and concurrent validity of the RRTW scale were supported in this study. The results of this study indicate the construct of readiness for RTW can vary by disability duration. Physical health appears to be a significant barrier to RRTW for the job attached/working group while mental health significantly compromises RRTW with the non-job attached/not working group.

Keywords

Return-to-work, Measurement, Musculoskeletal, Readiness for change, Work disability, Workers' compensation

1 This study is currently under review by the Journal of Occupational Rehabilitation.

4.1. Introduction

Return-to-Work (RTW) ultimately depends on the decision-making and behavior change process of the individual experiencing work disability [6]. The process involved in RTW requires the conceptualization of a developmental phenomenon influenced by various temporal aspects associated with physical, psychological and social factors that affect work disability [5, 18, 24]. The Readiness for Change Model has been applied in occupational rehabilitation to identify social and individual factors that influence RTW behaviour after an injury or illness [1, 5]. The stages of the Readiness for Change Model are consistent with the transtheoretical model of behaviour change identifying five distinct stages: precontemplation, contemplation, preparation, action and maintenance [5, 20].

4.2. Readiness for Change Model

The Readiness for Change Model used in occupational rehabilitation can help rehabilitation professionals understand how an individual progresses through stages of change [5]. The Readiness for Change Model suggests each stage is determined by one's own decisional balance, self-efficacy and change process [5]. The self-efficacy of an injured worker's ability to resume work has continually been shown as a significant predictor of RTW [17]. The identification of what stage an individual is in during the RTW process can assist in the appropriate selection of a personalized intervention focusing on aspects associated with readiness for RTW unique to that stage [1]. For example, earlier stages of change could focus on initiation of RTW behaviour while later stages concentrate on maintenance of the RTW behaviour. In addition to the benefits of stage specific intervention, identifying what stage of change an individual is in could also help determine RTW outcomes suitable for each stage.

4.3. Readiness for Return-to-Work Scale

The Readiness for Return-To-Work (RRTW) scale assesses stages of readiness for RTW and was developed and validated in a Canadian study with lost-time claimants who had experienced a work related musculoskeletal (MSK) disorder of 1-month duration [5]. Validity of the RRTW scale was also investigated in a Norwegian study evaluating a 5-day inpatient occupational rehabilitation program [1]. The two-part scale assesses RRTW for persons not working and readiness for work maintenance for individuals who are working [1, 5]. Franche et al. [5] identified 4 stages of change for those not working: (1) Precontemplation: the injured worker is not thinking about behaviours that would initiate a RTW. (2) Contemplation: the injured worker uses a decisional balance when considering RTW but is not actively engaging in behaviours involved in RTW. (3) Prepared for Action-Self-evaluative: the injured worker participates in behaviours such as seeking information regarding RTW, testing their abilities to RTW, and making tangible plans. (4) Prepared for Action-Behavioural: the injured worker engages in behaviours that put their RTW plan into action. In the study by Braathen et al. only 2 stages were identified for individuals who were not working: 1) RTW inability which corresponds with Franche et al.'s stage of precontemplation and 2) RTW uncertainty corresponding with Franche et al.'s stage of contemplation [1, 5]. In addition to these differences, a prepared-for-action stage was not identified in the study by Braathen et al. [1]. This was thought to be attributed to the short length of program, which may not have provided enough time for transition to the next stage [1]. For those working, both studies revealed the presence of Uncertain Maintenance and Proactive Maintenance stages. The Uncertain Maintenance stage is characterized by higher levels of functional disability and fear avoidance with challenges staying at work [1, 5]. In the Proactive Maintenance stage, injured workers

utilize skills and social supports to manage high-risk situations that can lead to relapse and employ preventative strategies [1, 5].

The somewhat inconsistent results of studies on the RRTW scale indicate a need for further validation to confirm readiness dimensions. In addition, culture and patient setting can influence the construct of RRTW, therefore validation in different settings and with various populations is required [1].

4.4. Objectives and Study Hypothesis

The aim of this study was to investigate the construct and concurrent validity of the RRTW Scale in a Canadian occupational rehabilitation sample. We built on the studies of Franche et al. [5] and Braathen et al. [1] by comparing constructs related to RRTW previously examined in those studies (pain and health surveys) within a population of injured workers with sub-acute (28-84 days post injury) or chronic (84+ days post injury) MSK disorders. We also examined relationships with a new construct, RTW expectations.

We hypothesized:

1. Earlier stages of change are associated with higher levels of pain severity and pain-related disability as reported on the pain Visual Analogue Scale (VAS) and Pain Disability Index (PDI). Research indicates lower pain levels are associated with RTW [23] and among injured workers with work-related back injuries, persistent pain has been identified as one of the most important obstacles related to RTW [4].

2. Earlier stages of change are associated with more compromised physical and mental health measured through the SF-36 health survey. Research demonstrates sickness absence is associated with increased levels of subjective health complaints [22] and perceptions of better general health and higher SF-36 mental health scores resulted in higher probability of RTW [13].

3. Later stages of change are associated with better RTW expectations. Research has shown recovery expectations are a consistent predictor of activity limitation and are predictive of future work outcome [14]. Also, negative work-related recovery expectations have been associated with longer duration of time-loss benefits and time to claim closure [10].

4.5. Methods

4.5.1. Study Design

A cross-sectional study was performed evaluating baseline measures from a clinical trial on claimants attending an outpatient occupational rehabilitation program in Edmonton, Alberta, Canada from November 17, 2014 to June 30, 2015. Data were obtained through claimant completed surveys/questionnaires and the Workers' Compensation Board (WCB) Alberta/Millard Health administrative and clinical databases, which have previously been used for research. The University of Alberta's Health Research Ethics Board approved this research.

4.5.2. Setting

The aim of the rehabilitation program was to facilitate a RTW outcome through functional restoration and graded activity, and typical program duration is 4 to 6 weeks. For

claimants who commence the RTW program with a job to return to, modified work also becomes a component of the RTW program.

4.5.3. Participants

The study used data from claimants with open workers' compensation claims for MSK disorders who underwent an occupational rehabilitation program at an outpatient facility. At time of admission, claimants were either considered job attached (claimant is employed but experiencing ongoing disability stopping them from completing full work duties) or non-job attached (claimant does not have a position to return after program discharge).

Inclusion criteria included all claimants enrolled in an occupational rehabilitation program during the study timeframe who were over the age of 18 years and completed the entire RRTW scale at program admission. Claimants were excluded from the study if they did not complete all aspects of the scale, required a translator during their program, were diagnosed with a head injury or traumatic psychological injury, completed less than 5 days of their program, or were removed from their program for either medical or non-compensable reasons. For claimants who attended multiple programs during the study timeframe, demographic and instrument information from their last program were used.

4.5.4. Data Collection

Data were collected through WCB Alberta/Millard Health clinical and administrative databases for claimant characteristics such as age, sex, diagnosis, employment status, marital status, and level of education. On the first day of the program, data were collected through surveys and questionnaires evaluating pain, general health, RTW expectations and RRTW.

4.6. Scales and Questionnaires

4.6.1. Readiness for Return-To-Work Scale

RRTW was measured using the original version of the RRTW Scale [5]. The RRTW scale is a 22-item measure of the RRTW stages and consists of two scales; Scale A contains 13 items for individuals who are not working and Scale B includes 9 items for individuals who are working either part or full time. Each item is scored using a 5 point scale (1 = strongly disagree, 5 = strongly agree) representing a specific readiness stage: Precontemplation (items a1, a2, a13); Contemplation (items a9, a11, a12); Prepared for Action-Self-evaluative (a4, a7 (item scale reversed), a8, a10); and Prepared for Action-Behavioural (a3, a5, a6) for those not back at work and Uncertain Maintenance (b5, b6, b7, b8 (item scale reversed), b9) or Proactive Maintenance (b1, b2, b3, b4) for those who are currently working. The scale provides a final score for each readiness stage by taking the mean of the items that create that factor [5]. Higher scores associated with a readiness stage indicate higher level of beliefs associated with that stage [5].

4.6.2. Pain Disability Index

Perceived disability due to pain was measured using the Pain Disability Index (PDI) [15]. The 7-item self-report inventory measures general and domain-specific disability related to chronic pain. Level of disability is rated on a scale of 0 (no disability) to 10 (total disability) in 7 areas of life activities: family/home responsibility, recreation, social activity, occupation, sexual behaviour, self-care, and life-support activity. Higher scores indicate higher levels of perceived disability. To overcome issues associated with missing data, percentage PDI, calculated as the total score divided by the total possible score for only the items completed is recommended and

was used in this analysis [8, 11]. Higher scores out of 100 indicate higher levels of perceived disability.

4.6.3. Pain Visual Analogue Scale

The pain Visual Analogue Scale (VAS) was used to measure perceived pain intensity [12]. The scale is anchored at both ends where 0 indicates “no pain” and 10 describes “pain as bad as it could be” or “worst imaginable pain”; [8, 12]. Higher scores out of 10 indicate greater levels of pain intensity.

4.6.4. SF-36v2 Health Survey

General health was assessed using the SF-36v2 Health Survey [28]. Eight domains (physical functioning, role participation with physical health problems (role-physical), bodily pain, general health, vitality, social functioning, role participation with emotional health problems (role-emotional), and mental health) considered significant in describing and monitoring individuals suffering from illness or disease are measured in terms of functioning and personal evaluation [28]. Scores range from 0 to 100 with higher scores indicating better health. The 8-scale profile can be reduced to 2 component summary measures. The physical and mental component summary measures provide a summary of an individual’s health from broad physical and mental health perspectives and were used to determine if functional limitations existed in either of these major components of health [28].

4.6.5. Return-to-Work Expectations Questionnaire

Recovery expectations have been found to be associated with the future recovery and RTW of individuals who experience MSK disorders [7]. The RTW Expectations Questionnaire was used to measure claimant RTW expectations [8]. The questionnaire has demonstrated adequate internal consistency ($\alpha = .75$) and has been shown to correlate moderately with measures of pain intensity and reported disability in patients with low back pain [8]. It has also demonstrated some predictive validity in claimants with chronic low back pain [9]. A 5-point Likert scale (1=strongly disagree, 5=strongly agree) is used to rate agreement with 3 statements about the likelihood of returning to work. The average of the 3 ratings was calculated, providing a total score out of 5, with lower scores representing more positive expectations.

4.7. Statistical Analyses

Socio-demographic characteristics of claimants were summarized using descriptive statistics. Characteristics of the sample was stratified by job attachment status and compared using Chi Square and independent t tests. Claimants were stratified by job attachment status instead of working and not working groups as identified in the studies by Franche et al. [5] and Braathen et al. [1]. Since our study was conducted within a rehabilitation context, all claimants were off work or experiencing difficulty completing regular work duties, and because there are significant differences observed on several characteristics between claimants based on job attachment status. Characteristics of claimants between RRTW factors was compared using descriptive statistics and one-way ANOVA.

Internal structure of the RRTW scale was investigated as a source of construct validity evidence using exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and Cronbach's alpha to evaluate reliability of the subscales. Concurrent validity was investigated with analyses involving comparisons of groups reflecting the stages of change [5] on relevant constructs using ANOVA and MANOVA with post hoc analyses. Our hypotheses were tested on the RTW readiness stages found for the job attached and non-job attached groups.

4.7.1. Construct Validity Analysis

The job attached and non-job attached status groups were randomly divided into 2 subsamples to allow for cross validation of the factors obtained using EFA. Missing data were managed using listwise deletion. 8 cases were missing from the original data set (n=389). For the job attached group (n=114), an EFA was completed using 13 items; for the non-job attached group (n=109), an EFA was completed with 9 items. Prior to conducting an EFA, we investigated the appropriateness of the data for factor analysis. The Kaiser–Meyer–Olkin value was 0.72 for the job attached group and 0.55 for the non-job attached group, which is above the acceptable value of 0.5, and Bartlett's Test of Sphericity was statistically significant for both groups; therefore, we proceeded with the EFA. Evaluation of the scree plot and eigenvalues greater than 1.0 were used to determine the potential number of factors.

EFA was completed using principal components extraction with Varimax rotation. An orthogonal solution was attempted first as it could provide support for the theoretically distinct groups corresponding to the stages of change. In an attempt to further acquire simple structure, an oblique transformation using Direct Oblimin was employed following the orthogonal approach. The final factor solution was determined using the criterion of simple structure - where

most variables load onto only 1 factor and the factors obtained are interpretable. Items that loaded onto more than 1 factor or demonstrated unpredictable behaviour with factor loadings between analyses were considered to have a nature too complex for interpretation and removed from subsequent analyses [21]. In our analyses, simple structure was obtained using principal components extraction with Varimax rotation (i.e., orthogonal solution) with little advantage gained in using an oblique transformation. Item loadings were retained with factor loading of 0.3 or greater [16].

We intended to cross-validate our findings from the EFA using 2 CFA for both job attached and non-job attached groups; however, due to the small subsample size of the non-job attached group (n = 47), a CFA was not completed as a sample size of 100-200 is recommended when each factor has a loading of at least 3 items [2]. A CFA was completed with the second subsample of the job attached group (n=111) using AMOS Software SPSS 23.0 (SPSS Inc., 2015a). Four goodness-of-fit indices were used to measure the fit of our model to the data: Comparative Fit Index (CFI), X^2, X^2/degrees of freedom ratio, and Root Mean Standard Error of Approximation (RMSEA). Similar cut-off criteria as Franche et al. [5] were used for these indices to indicate model-data fit with required values between .90 and 1 for the CFI [25], X^2/degrees of freedom ratio close to 5 [5] and a value of $\leq .05$ for RMSEA [27].

4.7.2. Concurrent Validity Analysis

Concurrent validity of the RRTW scale was demonstrated using Pearson's correlation with related scales and questionnaires. Groups were created by their stages of change and then compared on relevant outcomes such as pain, health, and RTW expectations. We anticipated claimants in the earlier stages of change would have higher levels of pain severity and pain-

related disability while claimants in the later stages of change would have lower perceived pain and disability. We also expected claimants would have more compromised physical and mental health if in the earlier stages of change compared to claimants in the later stages of change. RTW expectations were anticipated to be better among those who were in the later stages of change compared to those in the earlier stages of change.

4.8. Results

Of the 389 claimants who completed the entire RRTW scale such that we were able to identify the readiness stage they belonged to, 224 were job attached/working group and 165 were non-job attached.

4.8.1. Claimant Characteristics

Claimant characteristics are reported in Table 1. Claimants were predominantly male (64.0%), in their mid-40s (mean age 44 years), married (38.3%), achieved a high school education (24.2%), with an annual income of $60,000 CDN. Claimants had moderate levels of pain and disability (mean pain VAS = 4.8/10 and mean Pain Disability Index = 47/100), physical and mental health (SF-36 PCS =34.0/100, SF-36 MCS =41.5/100) and slightly negative RTW expectations (3.4/5). Statistically significant differences were observed between claimants in the job attached and non-job attached groups at program admission on claimant characteristics such as sex ($p < 0.01$), marital status ($p < 0.01$), income ($p < 0.01$), education level ($p = 0.02$) and disability duration measured in days from date of accident to admission to program ($p < 0.01$). No statistically significant difference was observed between groups for age ($p = 0.54$).

In comparison to claimants who were job attached, those who were non-job attached were more likely to have lower perceived mental health ($p < 0.01$) and RTW expectations ($p < 0.01$) and higher pain disability measured through the PDI ($p < 0.01$). Statistically significant difference were not observed for pain VAS ($p = 0.91$) and perceived physical health ($p = 0.92$) between the job attached and non-job attached groups.

4.8.2. RRTW Scale A: For Those Not Back At Work

The EFA of the RRTW scale A (n=109) found 3 factors. We removed 1 factor as the items related to this factor loaded onto multiple factors and less than 1% of our sample rated themselves in this group. Using principal components extraction with Varimax rotation, we were able to identify a 3-factors solution where no items loaded onto more than 1 factor. See Table 2. We found 2 items (a4, a7) related to Prepared for Action- Self-evaluative; however we decided to drop item a10 from the model because the commonality, or shared variance of this item with other items in the scale, was low (< 0.3). The 3 factors solution explained 65.8% of the variance. The factors identified were Contemplation (contributing 22.8%), Prepared for Action-Self-evaluative (contributing 21.8%) and Prepared for Action-Behavioural (contributing 21.2%). Cronbach's alpha was 0.72 for contemplation, 0.69 for Prepared for Action-Self-evaluative and 0.72 for Prepared for Action-Behavioural.

4.8.3. RRTW Scale B: For Those Who Are Currently Back At Work

Using principal components extraction with Varimax rotation, we were able to identify a 2-factors solution for the working group (n=114) where all items loaded onto the appropriate factor. See Table 2. Both factors correspond to the original scale and all original items were

contained within the uncertain work maintenance stage (items b5-9) or proactive work maintenance stage (items b1-4). The 2-factor solution explained 47.5% of the variance. The factors were uncertain work maintenance (explaining 26.6%) and proactive work maintenance (explaining 20.9 %). Cronbach's alpha was 0.76 for Uncertain maintenance and 0.59 for Proactive Maintenance.

CFA was carried out on the second subsample for only the job attached group (n=111) using the same items stemming from the exploratory analysis (9 items for the working group) to test the 2-factor structure for the job attached group. The variables were correlated to assess the fit of the model to the data ($p > 0.05$). The fit of the model was acceptable with the following global fit indices: CFI = 0.92, $X^2 = 38.82$, df = 27, $X^2/df = 1.44$ and RMSEA = 0.04.

4.8.4. Characteristics of Claimants Between RRTW Factors

Characteristics of claimants between RRTW factors are reported in Table 3. Statistically significant differences were found for age ($p=0.03$) and disability duration ($p<0.01$) between RRTW factors. See Table 4. No statistically significant differences were observed between RRTW factors on claimant characteristics such as sex, marital status, income, and education level.

4.8.5. Concurrent Validity

A MANOVA was used to compare pain levels as the pain VAS and PDI were highly correlated ($r = 0.82$). See Table 5. A statistically significant difference was found among RTW readiness stages and pain levels (Wilks' Lambda = 0.88, $F=5.09$, $p < 0.01$); however, the effect size was small ($n^2= 0.06$) [26]. For the PDI, univariate Bonferroni post-hoc analyses found a

statistically significant difference between the Contemplation and Uncertain and Proactive Maintenance stages and between the Prepared for Action- Behavioural and Proactive Maintenance stages. For the pain VAS, univariate Bonferroni post-hoc analyses found a statistically significant difference between the Contemplation and Prepared for Action-Behavioural and Proactive Maintenance stages. Pain levels generally decreased as the RTW readiness stages progressed from not working factors to the working factors confirming our hypotheses that earlier stages of change are associated with higher levels of pain rating. However, unexpectedly, the mean pain ratings as measured by the PDI and VAS were higher for those in the Prepared for Action-Behavioural group compared to the Prepared for Action-Self-evaluative group but a statistically significant difference was not found between these factors.

Two one-way ANOVAs were used to compare the mean scores from the SF-36v2 physical and mental component summary measures for each of the groups corresponding to RTW readiness stages. See Table 6. A statistically significant difference ($F= 3.28$, $p< 0.01$) existed between physical component summary measures and RTW readiness stages with a small effect size ($n^2 = 0.04$). Bonferroni post hoc analysis found a statistically significant difference between the Uncertain Maintenance and Proactive Maintenance groups. A statistically significant difference ($F= 7.08$, $p< 0.01$) with a small effect size ($n^2= 0.09$) was found between RTW readiness stages and mental component summary measures. Bonferroni post hoc analysis found statistically significant differences between the Contemplation and Proactive Maintenance stages and between the Prepared for Action-Behavioural and Proactive Maintenance stages. Physical and mental component summary measures generally improved as the RTW readiness stages progressed from not working factors to working factors confirming our hypotheses that earlier stages of change are associated with more compromised physical and mental health.

However, similar to the pain rating findings and the RTW readiness stages, physical and mental component summary measures were more favorable with the Prepared for Action-Self-evaluative group compared to the Prepared for Action-Behavioural group, but a statistically significant difference was not found between these factors.

A one-way ANOVA was used to compare RTW expectations for each of the groups corresponding to the RTW readiness stages. A statistically significant difference ($F= 12.67$, $p < 0.01$) existed between RTW expectations and RTW readiness stages with a medium effect size ($n^2 = 0.15$). Bonferroni post hoc analysis identified a statistically significant difference between the Contemplation and Prepared for Action-Self-evaluative stages; the Contemplation and Proactive Maintenance stages; the Prepared for Action-Behavioural and Proactive Maintenance stages; and the Uncertain Maintenance and Proactive Maintenance stages. Our hypothesis that RTW expectation scores improved as the RTW readiness stages progressed was found with the job attached group but not entirely with the non-job attached group or between the job attached and non-job attached groups. RTW expectation scores were better among the Prepared for Action-Self-evaluative group when compared to the Prepared for Action-Behavioural group and Uncertain Maintenance Group, but statistically significant differences were not found between these factors. Statistically significant difference were found between the Contemplation and Prepared for Action-Self-evaluative groups, Contemplation and Proactive Maintenance groups, and between the Proactive Maintenance and Prepared for Action-Behavioural groups and Proactive Maintenance and Uncertain Maintenance groups.

4.9. Discussion

Our findings support the construct and concurrent validity of the RRTW scale developed by Franche et al. [5] within a sample of workers' compensation claimants with sub-acute and chronic MSK disorders attending an outpatient occupational rehabilitation program. We identified 3 factors for the not working group: Contemplation, Prepared for Action-Self-evaluative and Prepared for Action-Behavioural which are similar to the not working factors identified by Franche et al [5]. We found that all items related to each factor for contemplation (a9, a11, a12), and Prepared for Action – Behavioural (a3, a5, a6) were the same as the original items used by Franche et al. [5]. We did however, remove 1 item (a10) from the Prepared for Action-Self-evaluative factor as this item loaded onto multiple factors within our study. Similar to the findings of Franche et al. [5] and Braathen et al. [1], 2 factors were identified for the job attached group, Uncertain Maintenance and Proactive Maintenance. There was an even distribution of claimants between the job attached factors at the time of admission to the rehabilitation program.

With our sample, we were unable to identify all 5 original stages of change defined by Prochaska et al. [20] with RTW behaviour. This is consistent with the study completed by Braathen et al. [1] whose findings suggest culture and setting may affect constructs of readiness for RTW. Our sample may have been too narrow and the inclusion of claimants with a diagnosis other than sub-acute and chronic MSK disorders could have assisted with this and with the overall generalizability of the study. Disability duration of our sample may have also affected our ability to identify all 5 original stages of change. From a disability and claims management perspective, future research should follow up with claimants after discharge from a rehabilitation

program to determine if there are changes in RRTW. The amount of support received during and after rehabilitation can significantly affect RRTW, and thus contribute to repeat claims.

In contrast to our study, Braathen et al. [1] evaluated a 5-day inpatient occupational rehabilitation setting and identified 2 factors for the not working group while Franche et al. [5] evaluated claimants with MSK disorders 1-month post injury and found 4 factors for their sample of not working claimants. We did not identify a Precontemplation stage, unlike the other 2 studies. RRTW items related to the Precontemplation stage (a1, a2, a13) loaded onto more than 1 factor and therefore this factor was removed from our model. The instability of this factor could be related to the low number of claimants (n=2) that rated themselves in the Precontemplation stage at admission to the rehabilitation program. The previous studies also identified a low proportion of individuals in the Precontemplation stage and Franche et al. [5] suggested at even 1-month post injury, assessments could have come too late to identify claimants in this stage. Life threatening or health conditions that are more degenerative than MSK disorders may be more likely to find individuals in the Precontemplation stage [5]. The inclusion of traumatic psychological injuries, head injuries, or other types of illness leading to work disability may have increased the number of claimants in our sample that identified their RRTW in the Precontemplation stage.

Compared to the other studies, our sample had a higher proportion of claimants who were job attached. At the time of admission to the RTW program, 57.6% of our claimants were considered job attached. In comparison, 31.6% were considered working in the study by Braathen et al. [1] and 52.7% of claimants were in the working group in Franche et al study [5]. Future research should investigate if there are any important differences in claimant and work

characteristics between the Uncertain Maintenance and Proactive Maintenance groups [5]. Disability duration (average 188 days) of our sample was considerably longer when compared to 5-days in the study by Braathen et al. [1] and 1-month in Franche et al's study [5]. Future research should investigate how disability duration can impact sustainability of RTW. Additionally, further validation of the RRTW scale is required within different compensation systems nationally and internationally which can affect RRTW.

4.9.1. Concurrent Validity

Evaluation of our hypotheses regarding the relationships between stages of change and theoretically relevant constructs including pain, physical and mental health, and RTW expectations was examined through associations with related scales and questionnaires. The stages of change identified in the original RRTW scale were generally associated, as expected, with the PDI, pain VAS, SF-36 physical and mental component summary scores and the RTW expectations questionnaire. Claimants in the Proactive Maintenance stage reported less pain, better health and higher RTW expectation ratings compared to the other stages of change while those in the Contemplation stage identified the most impairment with all of the related scales and questionnaires. Statistically significant differences were found between the Proactive Maintenance group and at least 1 other stage of change for all theoretically relevant constructs examined. The only statistically significant difference for the SF-36 physical component summary scores was between the Proactive Maintenance and Uncertain Maintenance groups. This could suggest that for those already working, physical barriers may be more of a limitation than barriers such as pain and mental health in the successful maintenance of work. In addition, a significant predictor of disability throughout all phases, even after controlling for psychosocial

occupational factors and injury severity, is high physical workplace demands [6]. Therefore, future studies need to focus on how the physical demands of the job influence RRTW. Statistically significant differences for pain, SF-36v2 mental component summary scores and RTW expectations were identified between the Prepared for Action-Behavioural and Proactive Maintenance stages. The Proactive Maintenance stage has been associated with high levels of coping [1]. The ability to cope with disability and inefficient coping styles are both identified as factors that should be included in the assessment of work ability as reported by insurance physicians [3]. The ability for claimants in the Proactive Maintenance stage to cope with and manage subjective and mental health complaints may increase RTW expectations and play a substantial role in the distinction between working and not working factors.

The relationships we expected between Prepared for Action-Self-evaluative and Prepared for Action-Behavioural stages and related constructs of pain, physical and mental health and RTW expectations were not observed. Claimants in the Prepared for Action-Behavioural stage rated higher levels of pain, compromised physical and mental component summary scores and RTW expectations compared to claimants in the Prepared for Action-Self-evaluative stage. For our sample of claimants, the prepared for action stages may resemble the original preparation stage identified by Prochaska et al [20] more than the split prepared for action stages recognized in the RRTW scale developed by Franche et al [5]. In our sample of claimants, behaviours that correspond to the Prepared for Action-Self-evaluative stage may be blurred with behaviours related to the Prepared for Action-Behavioural stage due to the nature of the RTW program where RTW plans are often immediately put into action. For claimants with a sub-acute or chronic MSK disorder, the Prepared for Action stages may be better described as a fluid stage instead of 2 distinct stages.

4.9.2. Strengths and Limitations of the Study

Strengths of our study include a large sample size especially for claimants in the job attached group. We were able to complete EFA with both the job attached and non-job attached groups identifying 5 factors that correspond RRTW. The CFA completed with the job attached group confirmed the fit of our model was acceptable based on 4 commonly used goodness-of-fit indices. Concurrent validity was established with related tools, which is consistent with other studies evaluating the RRTW scale [1, 5].

A limitation of our study was that we were unable to complete a CFA with the non-job attached group due to small subsample size of the non-job attached group which limits the strength of the validity evidence with this group. However, the EFA did identify 3 factors with items from the original RRTW scale loading onto the appropriate factors.

4.10. Conclusion

This study describes the construct and concurrent validity of the RRTW scale in an outpatient occupational rehabilitation sample of claimants with sub-acute and chronic MSK disorders in Canada. Our study found the construct of RRTW can vary depending on disability duration. Among claimants with a sub-acute and chronic MSK disorder who are employed and undergoing rehabilitation, physical health appears to be a significant barrier to RRTW while mental health significantly compromises RRTW with the non-job attached group. Further investigation between working and not working factors will assist in supporting future stage based interventions [5] and RTW outcomes appropriate for each stage.

4.11. References

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4.12. Tables

Table 4.1: Characteristics of Claimants Referred for a Return-to-Work Program

Table 1 Characteristics of Claimants Referred for a Return-to-Work Program

	Entire Sample (n=389)	Job Attached/ Working (n=224)	Non-Job Attached (n=165)
		Mean (SD) or %	
Age (years)	44 (12.3)	45 (11.9)	43 (12.8)
Sex (%)*			
Male	64.0	58.9	70.9
Female	36.0	41.1	29.1
Marital Status (%)*			
Married	38.3	41.5	33.9
Single	28.8	26.3	32.1
Common-law	11.6	12.5	10.3
Widowed	1.5	1.3	1.8
Divorced	6.2	6.3	6.1
Separated	3.3	2.2	4.8
Not specified	10.3	9.8	10.9
Gross annual salary (10K CDN)*	60.0 (28.4)	57.8 (24.1)	64.3 (32.9)
Education level (%) **			
Grade 8 or less	2.6	1.3	4.2
Partial high school	13.9	12.5	15.8
High school diploma	24.2	25.4	22.4
Partial technical	12.1	13.8	9.7
Technical diploma	19.3	19.2	19.4
Partial university	4.4	4.9	3.6
University degree	5.9	8.0	3.0
Not specified	17.7	14.7	21.8
Disability Duration (Days)*	188.0 (393.6)	148.4 (153.8)	241.8 (573.9)
Pain Disability Index (PDI)*	47 (2.0)	43 (1.9)	52 (1.9)
Visual Analogue Scale (VAS)	4.8 (2.1)	4.6 (2.1)	4.9 (2.0)
SF-36 Physical Component Summary (PCS)	34.0 (7.9)	34.2 (7.7)	33.6 (8.2)
SF-36 Mental Component Summary (MCS)*	41.5 (12.3)	43.6 (11.7)	38.6 (12.7)
RTW Expectations*	3.4 (0.8)	3.3 (0.8)	3.6 (0.8)

* Statistically significant difference at $p \leq 0.01$
** Statistically significant difference at $p \leq 0.05$

Table 4.2: Communality of Items Loading onto Factors

Table 2 Communality of Items Loading onto Factors			
RRTW Scale A Items	Readiness for Return-To-Work Factors		
	Contemplation	Prepared for Action- Self evaluative	Prepared for Action Behavioural
RRTW item a9	0.680		
RRTW item a11	0.849		
RRTW item a12	0.817		
RRTW item a4		0.788	
RRTW item a7		0.805	
RRTW item a8		0.744	
RRTW item a3			0.874
RRTW item a5			0.757
RRTW item a6			0.660
RRTW Scale B Items		Readiness for Return-To-Work Factors	
		Uncertain Maintenance	Proactive Maintenance
RRTW item b1		0.681	
RRTW item b2		0.647	
RRTW item b3		0.686	
RRTW item b4		0.667	
RRTW item b5			0.719
RRTW item b6			0.630
RRTW item b7			0.705
RRTW item b8			0.711
RRTW item b9			0.489

Table 4.3: Characteristics of Claimants Between RRTW Factors

Table 3 Characteristics of Claimants Between RRTW Factors

	C (n=55)	PA-S (n= 48)	PA-B (n=62)	UM (n=112)	PM (n=112)
	Mean (SD) or Percent				
Age (years)**	47 (11.6)	41 (12.9)	42 (13.0)	45 (12.0)	46 (11.8)
Sex (%)					
Male	72.7	64.6	74.2	61.6	56.3
Female	27.3	35.4	25.8	38.4	43.8
Marital Status (%)					
Married	38.2	29.2	33.9	38.4	44.6
Single	27.3	29.2	38.7	29.5	23.2
Common-law	10.9	10.4	9.7	10.7	14.3
Widowed	1.8	4.2	0	1.8	0.9
Divorced	9.1	6.3	3.2	6.3	6.3
Separated	7.3	2.1	4.8	2.7	1.8
Not specified	5.5	18.8	9.7	10.7	8.9
Gross Annual Salary (10K CDN)	64.0 (30.8)	62.4 (35.3)	64.5 (32.0)	56.6 (23.9)	59.0 (25.4)
Educational Level (%)					
Grade 8 or less	9.1	2.1	1.6	1.8	0.9
Partial high school	12.7	18.8	16.1	8	17
High School diploma	25.5	16.7	24.2	28.6	22.3
Partial technical school	7.3	14.6	8.1	13.4	14.3
Technical diploma	16.4	10.4	29	22.3	16.1
Partial university	5.5	0	4.8	4.5	5.4
University degree	1.8	6.3	1.6	6.3	9.8
Not specified	21.8	31.3	14.5	15.2	14.3
Disability Duration (Days)*	401.0 (951.5)	160.7 (153.3)	163.3 (178.1)	140.9 (177.0)	155.9 (126.7)
Pain Disability Index (PDI)*	56 (1.8)	47 (2.1)	54 (1.8)	47 (1.9)	40 (1.9)
Visual Analogue Scale (VAS)*	5.4 (2.2)	4.1 (2.0)	5.1 (1.8)	5.0 (1.9)	4.3 (2.2)
SF-36 Physical Component Summary (PCS) Score*	32.8 (7.5)	35.8 (8.5)	32.5 (8.3)	32.6 (7.4)	35.9 (7.7)
Mental Component Summary (MCS) Score*	36.8 (11.8)	40.0 (13.2)	39.0 (13.1)	42.0 (11.6)	45.2 (11.5)
RTW Expectations*	3.8 (0.8)	3.3 (0.8)	3.6 (0.7)	3.7 (0.6)	3.0 (0.8)

* Statistically significant difference at $p \leq 0.01$

** Statistically significant difference at $p \leq 0.05$

Table 4.4: ANOVA Between RRTW Factors and Claimant Characteristics

Table 4 ANOVA Between RRTW Factors and Claimant Characteristics

	F	df	p
Age	2.81	4	0.03
Sex	1.97	4	0.98
Marital status	1.21	4	0.30
Salary	1.37	4	0.25
Education level	0.54	4	0.71
Disability duration	4.93	4	<0.01

p, ≤0.05 = statistically significant

Table 4.5: MANOVA Differences in Pain Measured through the PDI and Pain VAS and RRTW Factors

Table 5 MANOVA Differences in Pain Measured through the PDI and Pain VAS and RRTW Factors

Variable	Wilks' Lambda	F	df	p	Partial eta squared
RRTW Factors	0.88	5.09	10	<0.01	0.06

p, ≤0.05 = statistically significant

Table 4.6: ANOVA Between RRTW Factors and Related Instruments

Table 6 ANOVA Between RRTW Factors and Related Instruments

	F	df	p	Partial eta squared
SF-36 PCS	3.28	5	<0.01	0.04
SF-36 MCS	7.08	5	<0.01	0.09
RTW Expectations	12.67	5	<0.01	0.15

p, ≤0.05 = statistically significant

4.13. Appendices

Appendix 4.1: RRTW Scale and RTW Expectations Questionnaire

Millard Health

RETURN TO WORK EXPECTATIONS QUESTIONNAIRE

The following questions refer to your current job or your most recent job if you are not currently working. Please circle a number indicating how strongly you agree or disagree with each statement.

	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1) I believe I am physically capable of returning to my usual work activities.	1	2	3	4	5
2) I believe my symptoms would become worse if I were to return to my usual work activities now.	1	2	3	4	5
3) I believe that my injury will interfere with my ability to do my usual work activities in the future.	1	2	3	4	5

Millard Health

READINESS FOR RETURN TO WORK

The following section is about your feelings about getting ready to return to work. Keep in mind that 'back to work' could mean back to part-time or modified work. Please circle a number indicating how strongly you agree or disagree with each statement.

1. **Are you currently back at work?** ☐ **No** → *complete items 1 to 13 only* ☐ **Yes** → *complete items 14 to 22 only*

FOR THOSE NOT BACK AT WORK If you are back at work, skip to the next page for items 14 to 22.	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1) You don't think you will ever be able to go back to work.	1	2	3	4	5
2) As far as you're concerned, there is no point in thinking about returning to work.	1	2	3	4	5
3) You are actively doing things now to get back to work.	1	2	3	4	5
4) Physically, you are starting to feel ready to go back to work.	1	2	3	4	5
5) You have been increasing your activities at home in order to build up your strength to go back to work.	1	2	3	4	5
6) You are getting help from others to return to work.	1	2	3	4	5
7) You are not ready to go back to work.	1	2	3	4	5

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8) You have found strategies to make your work manageable so you can return to work.	1	2	3	4	5
9) You have been wondering if there is something you could do to return to work.	1	2	3	4	5
10) You have a date for your first day back at work.	1	2	3	4	5
11) You wish you had more ideas about how to get back to work.	1	2	3	4	5
12) You would like to have some advice about how to go back to work.	1	2	3	4	5
13) As far as you are concerned, you don't need to go back to work ever.	1	2	3	4	5

FOR THOSE WHO ARE CURRENTLY BACK AT WORK	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
14) You are doing everything you can to stay at work.	1	2	3	4	5
15) You have learned different ways to cope with your pain so that you can stay at work.	1	2	3	4	5
16) You are taking steps to prevent having to go off work again due to your injury.	1	2	3	4	5
17) You have found strategies to make your work manageable so you can stay at work.	1	2	3	4	5
18) You are back at work but not sure you can keep up the effort.	1	2	3	4	5
19) You worry about having to stop working again due to your injury.	1	2	3	4	5
20) You still find yourself struggling to stay at work due to the effects of your injury.	1	2	3	4	5
21) You are back at work and it is going well.	1	2	3	4	5
22) You feel you may need help in order to stay at work.	1	2	3	4	5

Appendix 4.2: Pain Disability Index and Visual Analogue Scale

Saint Louis Behavioral Medicine Institute

Millard Health

PAIN DISABILITY INDEX

Service Line_____ **Program** _____

Name	Millard file no.	Date
Program	Team/assessment type	☐ Admission ☐ Discharge

The rating scales below measure the impact of chronic pain in your everyday life. We want to know how much your pain is preventing you from doing your normal activities. For each of the seven categories of life activity listed, circle the one number that best reflects the level of disability you typically experience. A score of "0" means no disability at all. A score of "10" means that all the activities you would normally do have been disrupted or prevented by your pain.

Your rating should reflect the overall impact of pain in your life, not just when the pain is at its worst. Make a rating for every category. If you think a category does not apply to you, circle "0".

Family/home responsibilities. This category refers to activities related to the home or family. It includes chores and duties performed around the house (e.g., yard work) and errands or favours for other family members (e.g. driving the children to school).

0 1 2 3 4 5 6 7 8 9 10
no disability — mild — moderate — severe — total disability

Recreation. This category includes hobbies, sports and other similar leisure time activities.

0 1 2 3 4 5 6 7 8 9 10
no disability — mild — moderate — severe — total disability

Social activity. This category refers to activities which involve participation with friends and acquaintances other than family members. It includes parties, theatre, concerts, dining out and other social functions.

0 1 2 3 4 5 6 7 8 9 10
no disability — mild — moderate — severe — total disability

Occupation. This category refers to activities that are a part of or directly related to one's job. This includes non-paying jobs as well, such as that of a housewife or volunteer worker.

0 1 2 3 4 5 6 7 8 9 10
no disability — mild — moderate — severe — total disability

Sexual behaviour. This category refers to the frequency and quality of one's sex life.

0 1 2 3 4 5 6 7 8 9 10
no disability — mild — moderate — severe — total disability

Self-care. This category includes activities that involve personal maintenance and independent daily living (e.g., taking a shower, driving, getting dressed, etc.).

0 1 2 3 4 5 6 7 8 9 10
no disability — mild — moderate — severe — total disability

Life-support activity. This category refers to basic life supporting behaviours such as eating, sleeping and breathing.

0 1 2 3 4 5 6 7 8 9 10
no disability — mild — moderate — severe — total disability

VISUAL ANALOGUE SCALE

On a scale of 0-10 (where 0 is no pain and 10 is unbearable pain, the worst pain you can imagine), mark where your pain is most of the time.

0 — no pain ——— 10 — unbearable pain

MH-158

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R-03-02

Appendix 4.3: SF36 Version 2 – Health Survey

SF36 Version 2 - HEALTH SURVEY

Millard Health

Service Line _____ **Program** _____

☐ Admission ☐ Discharge

Client name _____

Millard file no. _____ Date _____

Instructions:

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Answer each question by selecting the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

   ☐ 1 – excellent ☐ 2 – very good ☐ 3 – good ☐ 4 – fair ☐ 5 – poor

2. *Compared to one year ago,* how would you rate your health in general *now?*

   ☐ 1 – much better now than one year ago
   ☐ 2 – somewhat better now than one year ago
   ☐ 3 – about the same now as one year ago
   ☐ 4 – somewhat worse now than one year ago
   ☐ 5 – much worse now than one year ago

3. The following items are about activities you might do during a typical day. Does *your health* now limit you in these activities? If so, how much?

Activities	Yes, limited a lot.	Yes, limited a little.	No, not limited at all.
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.	1	2	3
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf.	1	2	3
c. Lifting or carrying groceries.	1	2	3
d. Climbing several flights of stairs.	1	2	3
e. Climbing one flight of stairs.	1	2	3
f. Bending, kneeling or stooping.	1	2	3
g. Walking more than a mile.	1	2	3
h. Walking several hundred yards.	1	2	3
i. Walking one hundred yards.	1	2	3
j. Bathing or dressing yourself.	1	2	3

4. During the *past 4 weeks,* have you had any of the following problems with your work or other regular daily activities *as a result of your physical health?*

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Cut down on the amount of time you spent on work or other activities.	1	2	3	4	5
b. Accomplished less than you would like.	1	2	3	4	5
c. Were limited in the kind of work or other activities.	1	2	3	4	5
d. Had difficulty performing the work or other activities (for example, it took extra effort).	1	2	3	4	5

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5. During the *past 4 weeks,* have you had any of the following problems with your work or other regular activities *as a result of any emotional problems* (such as feeling depressed and anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Cut down on the amount of time you spent on work or other activities.	1	2	3	4	5
b. Accomplished less than you would like.	1	2	3	4	5
c. Did work or other activities less carefully than usual.	1	2	3	4	5

6. During the *past 4 weeks,* to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors or groups?

☐ 1 – not at all ☐ 2 – slightly ☐ 3 – moderately ☐ 4 – quite a bit ☐ 5 – extremely

7. How much *bodily* pain have you had during the *past 4 weeks?*

☐ 1 – none ☐ 2 – very mild ☐ 3 – mild ☐ 4 – moderate ☐ 5 – severe ☐ 6 – very severe

8. During the *past 4 weeks,* how much did *pain* interfere with your normal work (including both work outside the home and housework)?

☐ 1 – not at all ☐ 2 – a little bit ☐ 3 – moderately ☐ 4 – quite a bit ☐ 5 – extremely

9. These questions are about how you feel and how things have been with you *during the past 4 weeks.* For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the *past 4 weeks:*

	All of the time	Most of the time	Some of the time	A little of the time	None of The time
a. Did you feel full of life?	1	2	3	4	5
b. Have you been very nervous?	1	2	3	4	5
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5
d. Have you felt calm and peaceful?	1	2	3	4	5
e. Did you have a lot of energy?	1	2	3	4	5
f. Have you felt downhearted and depressed?	1	2	3	4	5
g. Did you feel worn out?	1	2	3	4	5
h. Have you been happy?	1	2	3	4	5
i. Did you feel tired?	1	2	3	4	5

10. During the *past 4 weeks,* how much of the time has your *physical health or emotional problems* interfered with your social activities (like visiting friends, relatives, etc.)?

☐ 1 – all of the time ☐ 2 – most of the time ☐ 3 – some of the time ☐ 4 – a little of the time ☐ 5 – none of the time

11. How TRUE or FALSE is *each* of the following statements for you?

	Definitely true	Mostly true	Do not know	Mostly false	Definitely false
a. I seem to get sick a little easier than other people.	1	2	3	4	5
b. I am as healthy as anybody I know.	1	2	3	4	5
c. I expect my health to get worse.	1	2	3	4	5
d. My health is excellent.	1	2	3	4	5

From Ware JE Jr, Snow KK, Kosinski M, Gandek B, SF-36 Health Survey: manual and interpretation guide. Boston, MA: The Health Institute, New England Medical Centre, 1993:B1-B5. With permission.

Client signature _____

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Chapter 5

Motivational Interviewing for Injured Workers: Results of a Cluster Randomized Control Trial *2*

ABSTRACT

Purpose: Although functional restoration programs appear effective in assisting injured workers' return-to-work (RTW) after a work related musculoskeletal (MSK) disorder, the addition of Motivational Interviewing (MI) to these programs may result in higher RTW rates.

Methods: We conducted a cluster randomized controlled trial with claimants attending an occupational rehabilitation facility from November 17, 2014 to June 30, 2015. Six clinicians provided MI in addition to the standard functional restoration program and formed an intervention group. Six clinicians continued to provide the standard functional restoration program based on graded activity, therapeutic exercise, and workplace accommodations. Independent t-tests and chi square analysis were used to compare groups. Multivariable logistic regression was used to obtain the odds ratio of RTW for unemployed injured workers at the time of program discharge.

Results: 728 workers' compensation claimants with MSK disorders were entered into 1 of 12 therapist clusters (MI group = 367, control group = 361). Claimants were predominantly employed (72.7%), males (63.2%), with moderate levels of pain and disability (mean pain VAS = 5.0/10 and mean Pain Disability Index = 48/70). Claimants were stratified based on job attachment status as this is an important claimant descriptor and claims measure used in

occupational rehabilitation. RTW rates at program discharge were 12.1% higher for unemployed workers in the intervention group (intervention group 21.6% vs. 9.5% in control, p=0.03) and 3.0% higher for job attached workers compared to the control group (intervention group 97.1% vs. 94.1% in control, p=0.10). The odds ratio for unemployed claimants was 2.64 (0.69 - 10.14) and 2.50 (0.68 – 9.14) for employed claimants after adjusting for age, sex, pain intensity, perceived disability, and therapist cluster.

Conclusion: MI in addition to routine functional restoration is more effective than routine functional restoration program alone in improving RTW rates among unemployed workers.

Keywords

Motivational Interviewing, Musculoskeletal, Return-to-Work, Rehabilitation, Workers' Compensation

2 This study is currently under review by the Journal of Occupational Rehabilitation.

5.1. Introduction

Musculoskeletal (MSK) disorders result in substantial direct costs to health care systems and even larger indirect losses on productivity [1]. Although there is a high prevalence of MSK disorders in industrialized countries, a disproportionate share of the cost is related to a small proportion of cases associated with chronic pain [1, 27]. Evidence indicates that incapacity and chronic work disability are behaviours that are often the result of psychosocial factors [24]. Although recent evidence indicates a possible decrease in the total number of workers' compensation claims over the years, the cost of claims and number of paid days for compensation has increased [27]. The majority of injured workers (approximately 80 to 85%) return-to-work (RTW) quickly and without complications; however, the remaining 15 to 20%, experience long periods of work disability [26]. Additionally, their disability may be coupled with personal, emotional and/or work related issues that contribute to their delay in returning to work [3, 26]. It is estimated that 15 to 20% of workers with chronic work disability account for approximately 70% of the cost of work related disorders [21]. Physical limitations coupled with psychosocial issues influencing the worker's behaviour may be a contributing factor associated with the increase in the number of paid compensation days, an increase in claims cost and ultimately a delay in RTW.

The importance of a timely RTW after a medical absence is critical in the recovery process and ensuring employees RTW after an injury. This is especially important for injured workers who have been absent from work for 3 months or longer as the probability of returning to work decreases by ~50% after 12 weeks [26]. The percentage of those returning to work significantly decreases by 24 weeks with only a ~20% RTW rate and by 48 weeks only ~2% of

employees RTW post physical/psychological illness or injury [26]. Employees who have not returned to work within 3 months of their injury have a higher probability of following a course of chronic work disability [21].

Health care costs, absenteeism, presenteeism and productivity are all either directly or indirectly linked to behaviour related health practices [4, 6]. In addition, behavioural choices are important health measures for morbidity and mortality such as physical activity and substance abuse [4]. Health coaching is a behavioural intervention that has gained recognition in public health, health promotion and disease management for its capacity to address several behaviours, health risks and self-management of illness using a cost effective method [4]. Health coaching is an approach used by providers that facilitates clients in shifting and/or changing their behaviours in order to improve their health, quality of life or establishing and achieving their health promotion goals [23]. Motivational Interviewing (MI) is an evidence based method often incorporated into the process of health coaching and frequently outperforms conventional advice giving treatments for a wide range of behavior related problems and diseases including drug and alcohol abuse, smoking cessation and weight loss programs, increasing physical activity, and medication and diabetes management [2, 10, 16, 20].

MI is defined as being client-centered in nature but also directive in guiding clients towards behavioural change by assisting them in identifying and resolving ambivalence [28]. The philosophy of MI suggests individuals approach change at varying levels of readiness and the role of the assisting professional is to help increase client awareness in terms of implications for change [17]. MI is a method of assisting clients to identify and react to their current or potential issues and is viewed to be largely useful with individuals who are disinclined or

ambivalent about changing their behaviour [20]. The strategies of MI are more persuasive and supportive compared to traditional counseling methods that tend to be more coercive and argumentative; therefore, the goal of MI is to increase the individual's intrinsic motivation resulting in a change that occurs from within instead of being forced upon from without [20].

Client motivation is essential for successful rehabilitation. Research has shown that client motivation may be influenced by a variety of factors including the individual and environment as well as the rehabilitation process itself. [5, 26]. From a clinical perspective, the identification of modifiable risk factors affecting work disability, such as ambivalence, could assist in establishing targeted interventions that can avert the development of chronic work disability [21]. MI may be an effective tool in addressing both MSK disorders and psychosocial/behavioural barriers that limit a timely RTW for the 15-20% of workers who experience greater than normal complications with their RTW process.

MI is efficacious in reducing maladaptive behaviours and promoting adaptive behaviours in a broad range of situations where behaviour change is the focus, but has not been tested in the injured worker population [20]. Characteristics of MI techniques that complement its suitability for potential use in work rehabilitation programs focusing on behavioural change include: (1) its effectiveness with clients who are ambivalent or reluctant to change their behaviour; (2) it is efficacious even in small treatment quantities; (3) it can be applied across age, gender, cultural and socioeconomic statuses; and (4) it fits well in combination with conventional interventions and programs [11].

5.2. Objectives and Study Hypothesis

We evaluated the effectiveness of MI in a population of injured workers receiving workers' compensation and undergoing work rehabilitation. We hypothesized that MI in addition to a standard functional restoration program would lead to higher RTW rates among workers without jobs to return to. We anticipated that unemployed injured workers (not job attached) would be more ambivalent about returning to work due to uncertainty about their employment.

5.3. Methods

5.3.1 Study Design

In this cluster randomized controlled trial, a sample of 728 workers' compensation claimants with MSK disorders were entered into 1 of 12 therapist clusters (MI group = 367, control group = 361). This is a cluster RCT as clinicians in the rehabilitation programs were randomized as opposed to individual claimants. The intervention group included 6 clinicians who were formally trained in MI prior to commencement of the study and provided MI intervention in addition to a standard functional restoration program. The control group clinicians continued to provide the standard functional restoration program based on graded activity, therapeutic exercise, and workplace accommodations. The University of Alberta's Health Research Ethics Board approved this project.

The study took place at Millard Health, the primary occupational rehabilitation service provider for the Workers' Compensation Board (WCB) Alberta, Canada. All data were obtained from WCB Alberta clinical and administrative databases. There were no changes to methods after commencement of the study; however, one clinician in both the intervention and control

groups were excluded prior to the start of the study as they either changed departments or were no longer an employee of Millard Health/WCB Alberta.

5.3.2. Sample

All 728 claimants were Alberta workers who were injured at work. Claimants were included in the study if they had active workers' compensation claims for a MSK disorder and were participating in a RTW program between November 17, 2014 to June 30, 2015.

Claimants were excluded from the study if they were under the age of 18, referred for surgery during the time of their RTW program, had a traumatic brain injury or traumatic psychological injury, or could not read, write or speak English independently (i.e. those requiring an interpreter were excluded). Claimants were removed from the study if they had co-morbid conditions interfering with their rehabilitation, discharged due to non-compensable medical reasons or non-compliance with rehabilitation, or attended their RTW program for less than 5 days.

5.3.3. Procedure

Data collection was completed as part of the routine rehabilitation process, with the MI intervention added as a component of standard care for claimants in the intervention group. This permitted us to avoid disrupting service delivery at the facility while also providing a pragmatic context for the clinical trial.

Instead of randomly allocating individual claimants to study groups, we randomized the primary clinicians (clinicians responsible for overseeing the RTW program). Claimants were

therefore considered to have entered ‘clusters’ of individuals treated by the same clinician. This process has successfully been used in previous research studies conducted at the facility [7-9]. All primary clinicians were randomly allocated to one of two groups, an intervention group or a standard care control group. To form the 2 groups, two of the researchers (DG and JP) generated the random allocation using a computerized random number generator (www.random.org). Clinicians were assigned a number with odd numbers indicating intervention group membership. The clinicians included occupational therapists and exercise therapists. The intervention group included 4 occupational therapists and 2 exercise therapists while the control group consisted of 2 occupational therapists and 4 exercise therapists. Clinicians in the intervention and control groups were generally in their 30s (intervention group average age 30 years; control group average age 35 years) and were female (intervention group = 6 females; control group = 5 females, 1 male).

Prior to beginning the trial, clinicians assigned to the intervention group were formally trained in the fundamental processes of MI by an experienced trainer and certified member of the Motivational Interviewing Network of Trainers (MINT). Intervention group clinicians added an MI approach to standard functional restoration programs while clinicians in the control group continued to provide a routine functional restoration program. Clinicians made all claimant level treatment and RTW decisions. Logistics involving admissions and treatment process at the occupational rehabilitation facility where the data collection occurred was not altered. The number of MI sessions provided depended on clinical judgement of the intervention clinician with recommended intervention duration of 30-60 minutes as per previous MI studies identified in a recent systematic review [20].

Due to the nature of work rehabilitation, neither clinicians nor patients were completely blind to group allocation. However, claimants were not aware of the study and were blinded to group membership. Additionally, outcome evaluation was performed in a blinded fashion by obtaining information on claims outcomes from WCB administrative databases. Comparisons were made on key outcomes between claimants seen by clinicians within the 2 groups.

5.4. Intervention

5.4.1 Motivational Interviewing

The clinical procedure of MI involves a conversation about change with the primary purpose of strengthening the client's own motivation for change [28, 29]. The role of the MI practitioner is to evoke change talk within their clients, which is an expression of the client's desires, reasons, ability and need for change [28, 29]. The probability of behaviour change increases with verbalized intention and a detailed plan for implementation [11]. Evoking change talk using an empathetic and supportive approach reinforces the client's motivation and commitment to change [11, 28].

Miller and Rollnick describe 4 central processes (engaging, focusing, evoking and planning) that form the flow of MI which was used by the intervention clinicians. The first process is engaging, which is necessary to establish a helpful connection and working relationship. The process of engaging leads to focusing, the second central process, which is necessary to develop and maintain focus on a particular agenda [29]. The third process in MI is evoking which involves eliciting the client's motivations for change by having the individual

voice their arguments for change [29]. The fourth process involved in MI is planning which includes developing commitment to change and formulating a specific action plan [29].

Intervention clinicians completed a MI Adherence checklist (Figure 5.1) after every MI session they completed with their clients. This was to ensure the clinicians were adhering to the fundamental processes used in MI and to track how many clients they completed MI with. In addition to this, formal monthly coaching sessions were completed for 1 hour to promote MI skill development and provide an opportunity for the clinicians to ask questions about any difficulties they experienced using MI. Informal weekly meetings with the researchers were also completed to address any study questions.

5.4.2. Functional Restoration Programs

The past 20 years has seen therapies and program dedicated entirely to treating work related injuries existing as a range of programs including work hardening, occupational rehabilitation, industrial rehabilitation, and RTW [13]. Although the programs may have different names, their goals are fundamentally similar including restoring the physical abilities and functional tolerance of the injured worker in order to return them to gainful employment [13, 22]. RTW can be thought of as the process an injured worker undergoes in returning to work, their measureable fitness for work, and their vocational outcomes, including duration and/or extent of their inability to work as a result of their functional limitations [13, 15, 22].

Standards of practice, program parameters, and service delivery methods may vary depending on providers, the individual programs and the various disciplines involved in the RTW process, which can be influenced by the needs of the worker and employer, disability

management practices, insurance policies, and the practice of the work rehabilitation programs [13, 25]. The standards of practice used for this study are the services offered at Millard Health in Alberta, Canada, the primary service provider for WCB- Alberta. The current RTW services offered at Millard Health includes an interdisciplinary approach that focuses on improving physical and functional abilities, RTW planning, and individual counselling and educational workshops [30]. Referrals for services are based on claimant needs and the request for services from the claimant's claim manager/adjudicator or employer. The goal of the RTW services offered at Millard Health is to assist with the gradual development of strengths and skills towards a timely and successful return to work which often involves the participation of various stakeholders [30].

5.5. Measures

5.5.1. Intervention Variable

A dichotomous intervention variable was created indicating group allocation by identifying the intervention clinicians using WCB Alberta databases. The only difference between the intervention and control groups was the addition of MI to functional restoration programs for the intervention group, otherwise all other aspects of the RTW program delivery process were comparable across all claimants.

5.5.2. Potential Confounders

We obtained information on several potential confounders including age, sex, gross annual salary, marital status, disability duration, and overall pain and disability scores to control for the possibility of unequal group formation. These variables were chosen based on previous

studies examining injured workers within this setting which showed some predictive value or theoretical rationale for considering the variables as potential confounders [7].

5.5.3. Outcome Measure

The primary outcome was confirmed RTW status at time of program discharge measured through percentage of RTW success rates between the intervention and control groups. Claimants either returned to work (secured employment after program discharge) or were considered fit for work (unsecured employment after program discharge) after being discharged from their program. RTW status is an important claimant descriptor and claims measure used at the occupational rehabilitation facility where the data was collected. It informs clinicians and claim owners of the need for potential services beyond the standard functional restoration program and/or the need for wage replacement benefits. Within the RTW rehabilitation program context, these measures are regularly used as indicators of employment and were available for 100% of our sample.

5.5.4. Potential Harms

Review of MI literature did not identify any potential harmful effects [11, 20, 29]. In the event a claimant or clinician believed MI was causing adverse effects, psychologists and physicians were onsite to handle such circumstances. Any situations were to be followed-up and documented by the study team.

5.6. Statistical Analysis

All data records were reviewed to determine if there were any issues with the data such as missing data, outliers and inclusion of excluded criteria. Descriptive statistics were then calculated. Independent t-tests and chi square analysis were used to determine if a difference existed between groups for claimant characteristics and self-report pain and disability questionnaires. We then compared percentages of confirmed RTW success rates at time of program discharge, stratified based on job attachment status. Independent t-test and chi square analysis was used to test our hypotheses and determine if there were any statistical differences between the MI intervention and control groups. Multivariable logistic regression was used to obtain the odds ratio of RTW at the time of program discharge while adjusting for potential confounders and cluster. An intent to treat analysis maintained the benefits of randomization of the clusters and a 0.05 alpha level was used to determine statistical significance. All analyses were conducted using IBM SPSS 23 (Armonk, New York).

5.7. Results

5.7.1. Claimant Characteristics

728 workers' compensation claimants with MSK disorders were entered into 1 of 12 therapist clusters (MI group = 367, control group = 361). 74 claimants were excluded from the study due to medical reasons, non-compliance with their RTW program, or attendance in the RTW program for less than 5 days. For claimants who attended more than 1 RTW program during the study period, data from the last completed RTW program was used. A flow chart

showing the enrollment, allocation, and analysis of claimants at each step of the study is shown in Appendix 5.1.

Table 1 presents a descriptive analysis of key claimant characteristics. Claimants were predominantly employed (72.7%), males (63.2%), in their mid-40s (45 years (SD 12.2), married (39.6%), achieved a high school education, had an annual income of $59,800 CDN, with a disability duration of 233.7 days measured from date of accident to admission to RTW program, and had moderate levels of pain and disability (mean pain VAS = 5.0/10 and mean Pain Disability Index = 48/70). No statistically significant differences were observed between claimants in the MI and control groups at program admission on claimant characteristics such as sex, marital status, income, education level, age, and disability duration. A higher percentage of female claimants was observed in the control group versus the intervention group, however this was not statistically significant. There was a statistically significant difference in the percentage of claimants employed at time of referral to the RTW program between groups ($p \leq 0.01$).

Table 2 presents a descriptive analysis of key claimant characteristics for injured workers who were non-job attached at time of referral to the RTW program (MI group = 125, control group = 74). Claimants were predominately male (80.4%), in their 40s (average age 43 years), more likely to be single (33.7%) than married (26.1%), have a high school diploma, had an annual income of $69,600 CDN, with a disability duration of 481.8 days, and had moderate levels of pain but higher levels of disability (mean pain VAS = 5.0/10 and mean Pain Disability Index = 52/70). No statistically significant differences were observed between non-job attached claimants in the MI and control groups on claimant characteristics such as sex, marital status, income, education level, age, and disability duration.

Table 3 presents a descriptive analysis of key claimant characteristics for injured workers who were job attached at the time of referral to the RTW program (MI group = 242, control group = 287). Claimants were predominately male (56.7%), in their 40s (average age 45 years), more likely to be married (44.6%) than single (27.8%), have a high school diploma, had an annual income of $55,700 CDN, with a disability duration of 140.3 days, and had moderate levels of pain and disability (mean pain VAS = 5.0/10 and mean Pain Disability Index = 47/70). No statistically significant differences were observed between job attached claimants in the intervention and control groups on claimant characteristics such as sex, marital status, income, education level, age, and disability duration.

A higher percentage of claimants were observed to be male among claimants who are non-job attached in both the intervention and control groups (78.4% and 83.8%) compared to job attached claimants in the intervention and control groups (60.3% and 53.7%); however this was not statistically significant. Claimants who were non-job attached at program admission in both the intervention and control groups were more likely to be single (36% and 29.7%) while claimants who were job attached at program admission, in both the intervention and control groups, were more likely to be married (43.8% and 45.3%). Common law, divorced, and widowed responses were not considered as a part of the single or married categories. Claimants who were non-job attached at program admission in both the MI and control groups made +$10,000 more annually than claimants who were job attached at program admission despite group membership. High school diploma was the most common education level obtained in the MI and control groups for both non-job attached and job attached claimants. Disability duration was longer among the control groups for job attached and non-job attached claimants (146.2

days and 498.6 days) compared to job attached and non-job attached claimants in the intervention groups (135.3 days and 471.9 days); however, this was not statistically significant.

Independent t-tests were used to determine if a difference existed within groups and between groups for claimants on self-report pain and disability questionnaires. A statistically significant difference was not observed between claimants within the non-job attached and job attached groups and between claimants in the intervention and control groups at program admission on the self-reported PDI and VAS scores.

5.7.2. Intervention Adherence

Table 4 presents documented MI adherence among intervention clinicians. The percentage that MI was completed with claimants by clinician was reported to range from 7% to 79% and session durations lasted between 10 and 50 minutes. Four target behaviour categories were identified during the study; however RTW accounted for 75% of the target behaviours during the MI sessions. Due to the large difference in adherence among intervention clinicians, a sub analysis was completed to evaluate RTW rates among job attached and non-job attached claimants between the control group and intervention group stratified based on completed MI intervention.

5.7.3. Program Outcomes (Return to Work Rates)

A chi square analysis was used to compare RTW rates at program discharge between the intervention and control groups. RTW rates at program discharge were 12.1% higher for unemployed claimants in the intervention group (intervention group 21.6% vs. 9.5% in control,

p=0.03) and 3.0% higher for job attached claimants compared to the control group (intervention group 97.1% vs. 94.1% in control, p=0.10) (see Table 5).

Statistically significant differences (p<0.01) among RTW rates were found for non-job attached claimants between MI adherent and non-adherent clinicians. RTW rates were 9.7% for the control group, 18.0% for the non-adherent MI intervention group, and 33.3% for the adherent intervention group (MI was documented). The RTW rate increased to 47.4% when the adherent MI intervention included RTW as the target behaviour. A statistically significant difference (p=0.03) was also found among RTW rates for job attached claimants stratified based on MI adherence, with RTW rates higher among the MI adherent group (100%) compared to the non-adherent MI group (96.3%) and the control group (94.1%).

5.7.4. Multivariable Logistic Regression

Crude odds ratios (OR) for the intervention variable were 2.64 (1.09 – 6.41) in unemployed claimants and 2.11 (0.86 – 5.19) in employed claimants. After adjusting for age, sex, annual salary, marital status, pain intensity, disability duration, and perceived disability, the OR for the intervention variable changed to 3.76 (95% CI 1.38 – 10.25) in unemployed claimants and 2.00 (0.77 – 5.19) in employed claimants. The OR for unemployed claimants reduced to 2.64 (0.69 - 10.14) and increased to 2.50 (0.68 – 9.14) for employed claimants after adjusting for therapist cluster.

5.7.5. Adverse or Unintended Effects

No negative or unintended effects were reported by the clinicians or claimants during the duration of the study. Stakeholders including case managers, physicians, and employers also did not report any adverse effects during the period of the study.

5.8. Discussion

MI in addition to functional restoration programs appears to improve RTW outcomes among injured workers who were admitted to a RTW program without a job to return to. The use of MI appears to have helped some claimants who were non-job attached at program admission to resolve ambivalence regarding RTW. Although RTW rates at program discharge were also 3% higher for job-attached claimants in the intervention group compared to the control group, this was not statistically significant. However, MI may also have a role for increasing RTW rates among claimants that are job attached given that the intervention is low cost and low risk [9]. MI could also have an indirect impact on RTW rates as claimants in the intervention group where MI was not completed did have better RTW rates compared to the control group. To our knowledge, this is the first evaluation of MI in the population of injured workers undergoing rehabilitation. Longer-term follow up RTW rates between the intervention and control groups are required to determine the sustainability of the effects of MI.

5.8.1. MI Adherence

Documented MI adherence among intervention clinicians varied substantially but were generally poor with only a 26% overall adherence rate. It may be that only some clinicians used MI but did not complete the adherence checklist, which was not part of routine paperwork.

Alternatively, it may have been the case that some claimants were deemed inappropriate for MI or that some clinicians did not find MI useful, thus leading to low documented adherence rates. Regardless, we found that clinicians in the MI group with documented adherence had better RTW outcomes at program discharge especially if RTW was a target behaviour of MI. Future research should evaluate clinician's beliefs regarding the benefits and challenges of integrating MI into functional restoration programs. In addition, future research would likely benefit from added structure surrounding MI adherence to increase the fidelity of the intervention.

5.8.2. Future Research Considerations

The applicability of MI across a variety of issues, its brief and specific interactions, and practical use in combination with other active treatment methods has contributed to the relevance of this intervention in work rehabilitation practice [19]. Results of this study will provide disability providers with information regarding the impact of MI on RTW rates, including statistical and clinical relevance. Future research should focus on the inclusion of all claimants who enter a RTW program in the compensation system which could provide more insight into the application of MI in work rehabilitation. Future studies should also consider evaluating stage-based interventions that could assist in increasing RTW rates among claimants who are at various levels of readiness for RTW.

5.8.3. Alternative Explanations

There are some possible alternative explanations for our findings. Higher annual income levels were observed among non-job attached workers that attended the RTW program, which may be a contributing motivational factor in securing employment upon program discharge. In

addition, claimants who were non-job attached were more likely to be single which may have resulted in the earlier identification of intrinsic motivational factors for returning to work compared to those who are married and possibly turn to social supports, such as their spouses, first. However, the effect of our intervention variable was not confounded by the addition of salary or marital status to final models indicating these explanations are unlikely. Adjusting for therapist cluster did reduce the OR substantially, indicating that the effectiveness of MI may be differential across clinicians. However, the adjusted OR was still clinically meaningful (i.e. >2.0) after controlling for cluster effects.

5.8.4. Study Strengths

Strengths of the study include a pragmatic clinical context using a cluster randomized controlled trial design. Data were gathered in a Canadian occupational rehabilitation setting as part of routine client care with relatively few restrictions placed on our sample. This should provide a fairly accurate representation of claimants in this Canadian Compensation system undergoing occupational rehabilitation. In addition, no adverse effects were reported by clinicians or claimants as a result of this study.

5.8.5. Study Limitations

Study limitations include the exclusion of claimants with brain injury and traumatic psychological injury. It is unknown how MI could potentially impact RTW within these specific subpopulations of injured workers, however these are typically complex cases that may benefit from additional RTW interventions aimed at overcoming psychosocial barriers to RTW. This study also did not include claimants who required the use of an interpreter during the duration of

their RTW program due to the extensive linguistic component necessary for MI and the potential bias this could introduce with having an interpreter translate for the claimant. Another limitation is the unequal number of job attached claimants between the intervention and control groups. At the occupational rehabilitation facility where the data were collected, there are 3 potential RTW programs the claimants were triaged to and one of these excluded non-job attached claimants. Both clinicians in this program who were involved in the study were randomized to the control group, leading to increased numbers of non-job attached claimants in the intervention group. This was not foreseen at the time of randomization, and we did not want to affect the randomization procedure after data collection had begun. Another limitation was the fairly low documented adherence to the MI intervention (full adherence reported in only 26% of cases). However, we observed that claimants with clinicians reporting full adherence had better claims outcomes than either the non-adherent or control group in the follow-up year.

5.9. Conclusion

MI integrated into work rehabilitation appears to be more effective than routine rehabilitation programs alone in improving RTW rates among unemployed workers. MI could be an important addition to work rehabilitation programs as there are currently few evidence based, non-physical intervention methods to address psychosocial and behavioural barriers to recovery associated with MSK disorders. Further research is needed examining long-term outcomes and stage-based approaches to behavioural change through MI.

5.10. References

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5.11. Tables

Table 5.1: Characteristics of Claimants at Referral for Return-to-Work Program

Table 1 Characteristics of Claimants at Referral for Return-to-Work Program

	Entire Sample (n=728)	Intervention Group (n=367)	Control Group (n=361)
	Mean (SD) or Percent		
Employed at time of referral*	72.7	65.9	79.5
Age (years)	45 (12.2)	44 (12.0)	46 (12.3)
Sex (% male)	63.2	66.5	59.8
Marital Status (%)			
Married	39.6	37.6	41.6
Single	29.4	30.2	28.5
Common-law	10.0	9.3	10.8
Widowed	1.4	1.4	1.4
Divorced	6.7	6.8	6.6
Separated	3.6	4.1	3.0
Not specified	9.3	10.6	8.0
Gross annual salary ($10 k CDN)	59.8 (30.2)	61.4 (30.7)	58.1 (29.6)
Education level			
Grade 8 or less	3.8	3.8	3.9
Partial high school	14.0	13.9	14.1
High school diploma	24.7	23.4	26
Partial technical school	9.2	8.7	9.7
Technical diploma	19.1	20.4	17.7
Partial university	3.8	3.5	4.2
University degree	7.0	6.5	7.5
Not specified	18.3	19.6	16.9
Disability Duration (Days)	233.7 (688.0)	257.0 (721.8)	209.8 (652.1)
Pain Disability Index (PDI)	48 (2.1)	49 (2.0)	48 (2.2)
Visual Analogue Scale (VAS)	5 (2.2)	5 (2.1)	5 (2.2)

* *Statistically significant difference at $p < 0.01$.*

Table 5.2: Characteristics of Non-Job Attached Claimants at Referral for Return-to-Work Program

Table 2 Characteristics of Non-Job Attached Claimants at Referral for Return-to-Work Program

	Entire Sample (n=199)	Intervention Group (n=125)	Control Group (n=74)
	Mean (SD) or Percent		
Age (years)	43 (12.4)	43 (12.3)	43 (12.7)
Sex (% male)	80.4	78.4	83.8
Marital Status (%)			
Married	26.1	25.6	27.0
Single	33.7	36.0	29.7
Common-law	13.1	12.8	13.5
Widowed	1.5	0.8	2.7
Divorced	8.5	10.4	5.4
Separated	6.5	4.8	9.5
Not Specified	10.6	9.6	12.2
Gross annual salary ($10 k CDN)	69.6 (35.4)	70.6 (34.8)	68.0 (36.6)
Education level			
Grade 8 or less	6.0	7.2	4.1
Partial high school	15.6	18.4	10.8
High school diploma	25.1	23.2	28.4
Partial technical school	8.0	4.8	13.5
Technical diploma	20.1	24.8	12.2
Partial university	4.5	3.2	6.8
University degree	2.5	1.6	4.1
Not specified	18.1	16.8	20.3
Disability Duration (Days)	481.8 (1250.1)	471.9 (1170.0)	498.6 (1383.3)
Pain Disability Index (PDI)	52 (2.1)	53 (2.1)	50 (2.2)
Visual Analogue Scale (VAS)	5 (2.2)	5 (2.2)	5 (2.2)

There were no statistically significant differences observed between groups at $p < 0.05$.

Table 5.3: Characteristics of Job Attached Claimants at Referral for Return-to-Work Program

Table 3 Characteristics of Job Attached Claimants at Referral for Return-to-Work Program

	Entire Sample (n=529)	Intervention Group (n=242)	Control Group (n=287)
	Mean (SD) or Percent		
Age (years)	45 (12.0)	44 (11.8)	46 (12.2)
Sex (% male)	56.7	60.3	53.7
Marital Status (%)			
Married	44.6	43.8	45.3
Single	27.8	27.3	28.2
Common-law	8.9	7.4	10.1
Widowed	1.3	1.7	1.0
Divorced	6.0	5.0	7.0
Separated	2.5	3.7	1.4
Not specified	8.9	11.2	7.0
Gross annual salary ($10 k CDN)	55.7 (26.7)	56.2 (26.9)	55.3 (26.7)
Education level			
Grade 8 or less	3.0	2.1	3.8
Partial high school	13.4	11.6	15.0
High school diploma	24.6	23.6	25.4
Partial technical school	9.6	10.7	8.7
Technical diploma	18.7	18.2	9.2
Partial university	3.6	3.7	3.5
University degree	8.7	9.1	8.4
Not specified	18.3	21.1	16
Disability Duration (Days)	140.3 (183.8)	135.3 (140.2)	146.2 (225.0)
Pain Disability Index (PDI)	47 (2.1)	47 (1.9)	47 (2.2)
Visual Analogue Scale (VAS)	5 (2.2)	5 (2.1)	5 (2.2)

There were no statistically significant differences observed between groups at $p < 0.05$.

Table 5.4: MI Adherence Among Intervention Clinicians

Table 4 MI Adherence Among Intervention Clinicians

	Claimants During Study (n)	Claimants MI Completed With (%)	MI Session Duration (minutes)
Clinician			
1	72	5	10-30
2	71	56	15-20
3	65	8	10-30
4	64	17	10-45
5	47	4	15-50
6	48	6	30-40
Target Behaviours			% Target Behaviour
RTW/finding new employment (i.e. modified work, vocational programs)			75
Continue with/participate in RTW program (i.e. lifting, educational workshops, individual counselling			18
Make healthier choices (i.e. stop smoking, decrease medication use control blood pressure, deal with personal issues)			5
Return to regular life/sport/physical activity			2

Table 5.5: Program Outcomes

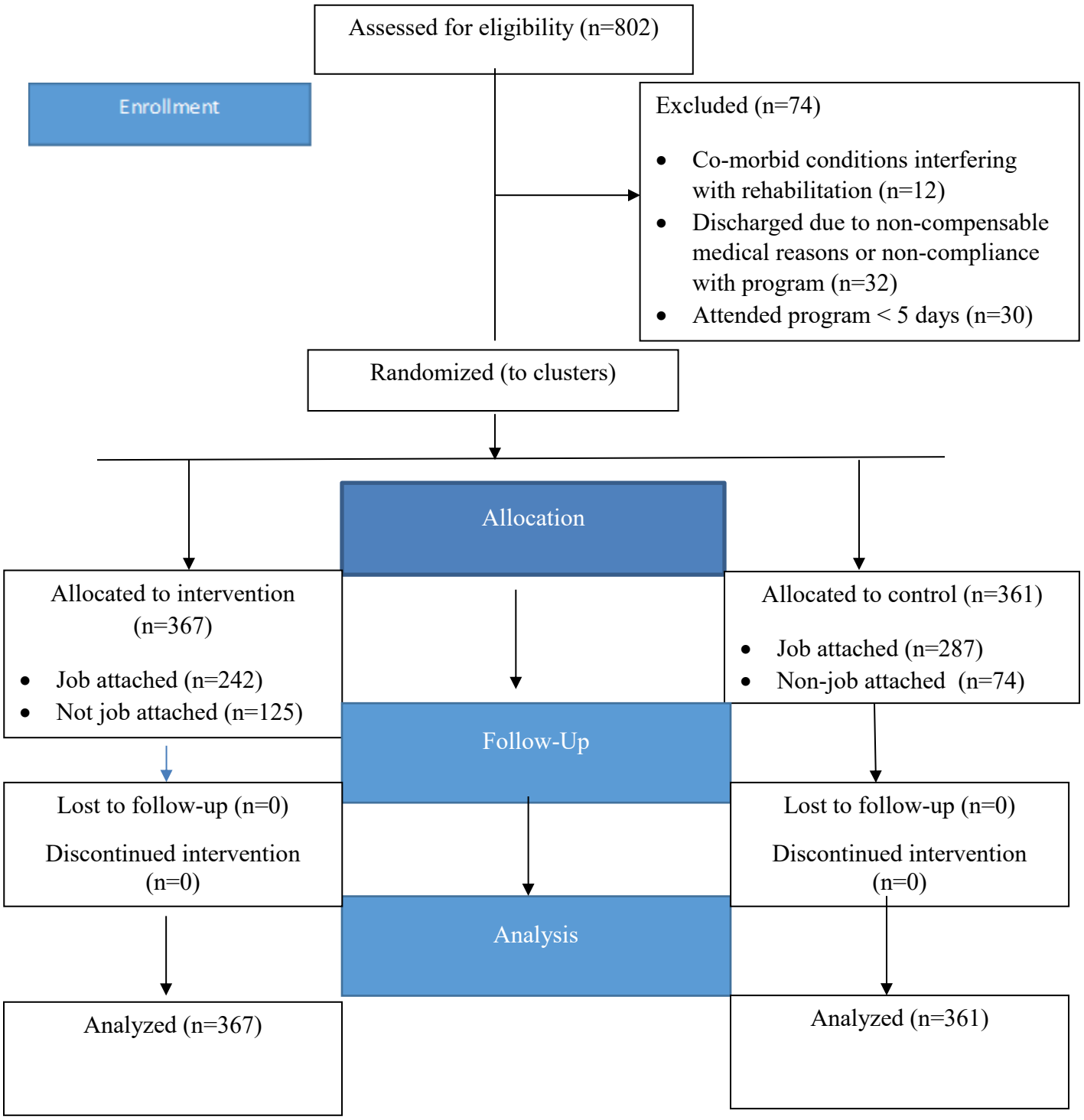
Table 5 Program Outcomes

Non-Job Attached			Program Outcome RTW	FFW	Total
MI Intervention Variable	Control Group	Count	7	67	74
		% within MI Intervention Variable	9.5	90.5	100
	MI Group	Count	27	98	125
		% within MI Intervention Variable	21.6*	78.4	100
Total		Count	34	165	199
		% within MI Intervention Variable	17.1	82.9	100
Job Attached			Program Outcome RTW	FFW	Total
MI Intervention Variable	Control Group	Count	270	17	287
		% within MI Intervention Variable	94.1	5.9	100
	MI Group	Count	235	7	242
		% within MI Intervention Variable	97.1	2.9	100
Total		Count	505	24	529
		% within MI Intervention Variable	95.5	4.5	100

Statistically significant differences at $p < 0.05$

5.12. Appendices

Appendix 5.1: MI Study Flow Diagram



Appendix 5.2: CONSORT Checklist

Section/Topic	Item No	Standard Checklist item	Extension for cluster designs	Page No *
Title and abstract				
	1a	Identification as a randomised trial in the title	Identification as a cluster randomised trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	See table 2	2
Introduction				
Background and objectives	2a	Scientific background and explanation of rationale	Rationale for using a cluster design	3-5, 8
	2b	Specific objectives or hypotheses	Whether objectives pertain to the the cluster level, the individual participant level or both	6
Methods				
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	Definition of cluster and description of how the design features apply to the clusters	8
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons		6-7
Participants	4a	Eligibility criteria for participants	Eligibility criteria for clusters	7-8
	4b	Settings and locations where the data were collected		6
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	Whether interventions pertain to the cluster level, the individual participant level or both	7,11
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	Whether outcome measures pertain to the cluster level, the individual participant level or both	12
	6b	Any changes to trial outcomes after the trial commenced, with reasons		N/A
Sample size	7a	How sample size was determined	Method of calculation, number of clusters(s) (and whether equal or unequal cluster sizes are assumed), cluster size, a coefficient of intracluster correlation (ICC or *k*),	8

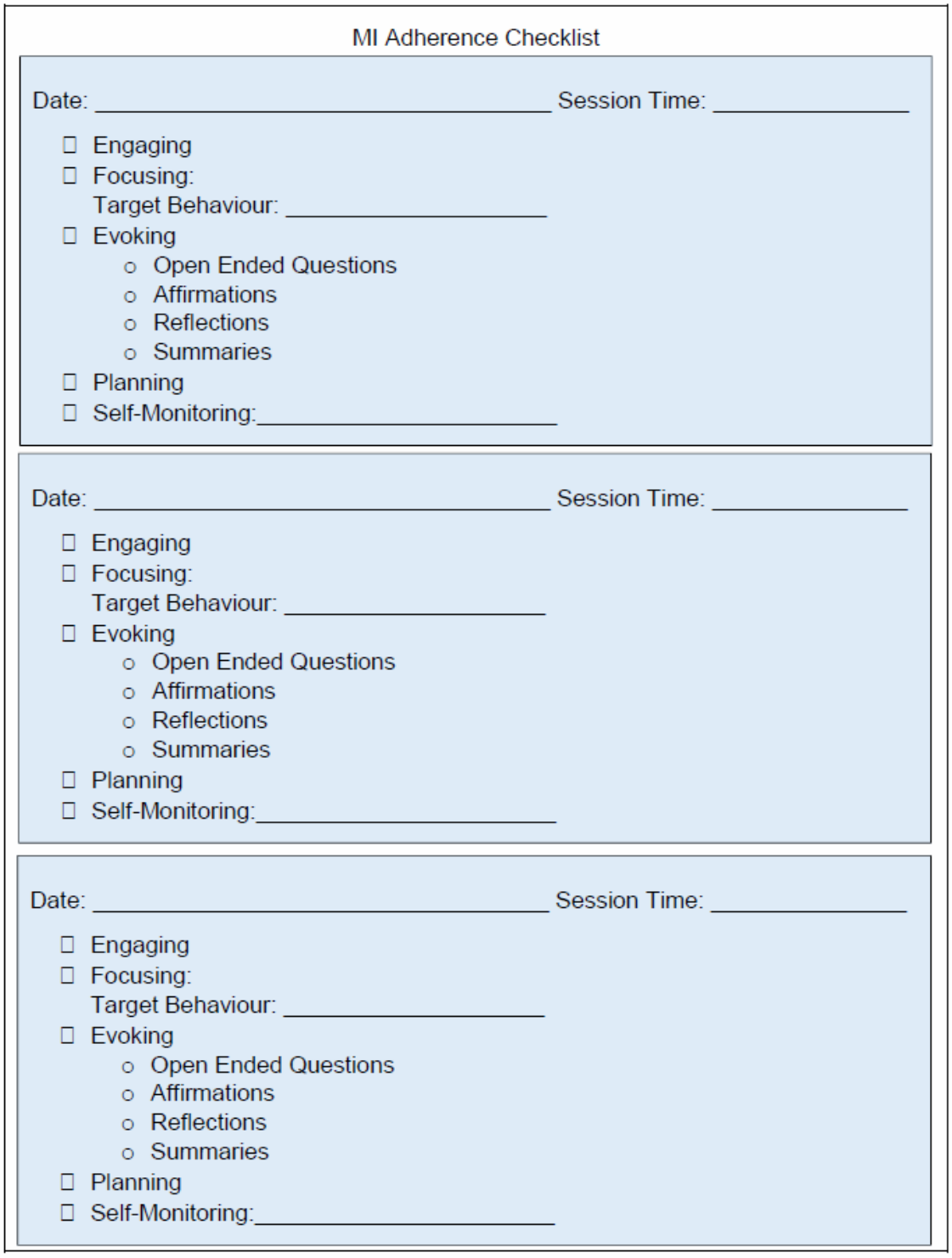
			and an indication of its uncertainty	
	7b	When applicable, explanation of any interim analyses and stopping guidelines		N/A
Randomisation:				
Sequence generation	8a	Method used to generate the random allocation sequence		8
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	Details of stratification or matching if used	8
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	Specification that allocation was based on clusters rather than individuals and whether allocation concealment (if any) was at the cluster level, the individual participant level or both	8,9
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	Replace by 10a, 10b and 10c	
	10a		Who generated the random allocation sequence, who enrolled clusters, and who assigned clusters to interventions	8
	10b		Mechanism by which individual participants were included in clusters for the purposes of the trial (such as complete enumeration, random sampling)	8
	10c		From whom consent was sought (representatives of the cluster, or individual cluster members, or both), and whether consent was sought before or after randomisation	8
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how		9
	11b	If relevant, description of the similarity of interventions		7,11
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	How clustering was taken into account	13
	12b	Methods for additional analyses, such as subgroup analyses and adjusted		13

		analyses		
Results				
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	For each group, the numbers of clusters that were randomly assigned, received intended treatment, and were analysed for the primary outcome	Figure 2
	13b	For each group, losses and exclusions after randomisation, together with reasons	For each group, losses and exclusions for both clusters and individual cluster members	Figure 2
Recruitment	14a	Dates defining the periods of recruitment and follow-up		7
	14b	Why the trial ended or was stopped		7
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	Baseline characteristics for the individual and cluster levels as applicable for each group	Tables 1-3
Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	For each group, number of clusters included in each analysis	Tables 1-5, Figure 2
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	Results at the individual or cluster level as applicable and a coefficient of intracluster correlation (ICC or k) for each primary outcome	13-17
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended		17
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory		17
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)		18
Discussion				
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses		20-21
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	Generalisability to clusters and/or individual participants (as relevant)	20
Interpretation	22	Interpretation consistent with		18-20

		results, balancing benefits and harms, and considering other relevant evidence	
Other information			
Registration	23	Registration number and name of trial registry	1
Protocol	24	Where the full trial protocol can be accessed, if available	1
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	1

5.13. Figures

Figure 5.1: MI Adherence Checklist



MI Adherence Checklist

Date: _____ Session Time: _____

- ☐ Engaging
- ☐ Focusing:
  Target Behaviour: _____
- ☐ Evoking
  - Open Ended Questions
  - Affirmations
  - Reflections
  - Summaries
- ☐ Planning
- ☐ Self-Monitoring:_____

Date: _____ Session Time: _____

- ☐ Engaging
- ☐ Focusing:
  Target Behaviour: _____
- ☐ Evoking
  - Open Ended Questions
  - Affirmations
  - Reflections
  - Summaries
- ☐ Planning
- ☐ Self-Monitoring:_____

Date: _____ Session Time: _____

- ☐ Engaging
- ☐ Focusing:
  Target Behaviour: _____
- ☐ Evoking
  - Open Ended Questions
  - Affirmations
  - Reflections
  - Summaries
- ☐ Planning
- ☐ Self-Monitoring:_____

Chapter 6

General Discussion and Conclusion

6.1 Overview

Disruptions in an injured workers' RTW process are a significant social problem affecting economic and personal well-being [4, 7, 19]. An understanding of causes and predictors related to work disability and RTW outcomes is necessary for developing effective disability prevention strategies [12]. Given that work disability and the RTW process are impacted by several physical, psychological, and social factors, and influenced by various factors at different times, it is necessary to conceptualize RTW as a developmental approach that considers several stages or phases of RTW [24]. However, there are currently few prospective studies evaluating the range of determinants influencing RTW, which limits our ability to detect meaningful risk factors associated with certain phases of the RTW process [12]. While there are many potential determinants of RTW that influence work disability and facilitate RTW, research in work rehabilitation has suggested that more information on psychosocial and behavioural risk factors is essential [13, 19, 23]; therefore, these factors have been the focus of this thesis research.

Psychosocial and behavioral factors associated with MSK disorders are important determinants of RTW outcomes [19]. However, evidence suggests poor timing of interventions has contributed to inadequate RTW outcomes. [12] Additionally, current psychosocial and behavioral RTW strategies are too narrow, which leads to ineffective interventions [23]. Pransky et al. [19] suggest research specific to psychosocial and behavioral interventions needs to consist of: identification of risk factors, development of innovative methods and strategies, clear

description of interventions, and skill development and adherence of practitioners. Furthermore, there is a need for an integrated conceptual framework to understand injured workers' decision-making processes and inform evidence-based interventions that address behaviour change regarding RTW [6, 19].

6.2 Integrating the Model of Human Occupation and Motivational Interviewing in Work Rehabilitation

6.2.1 Model of Human Occupation

An ideal model of RTW is difficult to achieve as it needs to consider the perspective of multiple stakeholders including the injured worker [19]. The Model of Human Occupation (MOHO) is the most widely used occupation-based model among occupational therapists (OTs) worldwide [15]. Occupation-based practice is important among OTs because the focus is on more than just injury reduction and enables individuals to participate in meaningful life occupations [16]. Work behaviour, according to MOHO, is influenced by four factors: volition, habituation, performance capacity and the environment [15]. Each of these factors influences RTW and how these factors interrelate ultimately impacts work behaviour [11]. The integration of MOHO with existing RTW models may provide a useful framework in understanding an injured worker's decision making process.

6.2.2 Motivational Interviewing

Motivational Interviewing (MI) is a client-centered approach designed to facilitate behavior change. The three most important theoretical foundations to MI approach for MI practitioners include: (1) behaviour change is influenced by motivation and can fluctuate over

time; (2) the practitioner's role is to provide a safe and supportive atmosphere to help facilitate behaviour change; and (3) behaviour change has multiple phases. [10, 17]. Evidence indicates that psychosocial undercurrents pervade most behavioural change, including ambivalence, self-efficacy, self-perception, and motivation [8]. MI views individuals as dynamic and complex, driven by contending and conflicting motives, resulting in ambivalence and fluctuating degrees of self-efficacy [1]. Thus, MI appears to be especially compatible for addressing psychosocial aspects related to behaviour change [1].

MI was originally used in addiction counseling; however, it has since been applied to various health related behaviours and issues [20]. Although MI has been shown to improve clinical outcomes with various conditions in a variety of settings, it has not previously been tested in a clinical trial with injured workers. There are several characteristics of MI which make it suitable for addressing behaviour change with injured workers including: (1) its effectiveness with individuals who are reluctant or ambivalent about behaviour change; (2) behaviour change can be achieved within a short timeframe; (3) the approach is not limited to individuals with specific demographic characteristics; and (4) it can easily be integrated with existing programs and interventions [1, 8]. In addition, the pivotal role motivation plays in occupational behaviours combined with the strategies involved in MI, appear to be well suited for increasing readiness of injured workers to RTW [10].

6.2.3 Practice Implications of Integrating MOHO and MI and Work Rehabilitation

Integrating MOHO and MI in work rehabilitation could provide OTs with a framework to better understand an injured workers' decision-making process and an approach that can facilitate participation in occupational behaviour. The integration of MOHO and MI provides

work rehabilitation OTs, and perhaps other work rehabilitation practitioners, with important clinical relevance to their practice.

6.3 Significant Findings of the Validation of the Readiness for Return-To-Work Scale Study

The findings for study two (chapter 4) support the construct and concurrent validity of the RRTW scale within a sample of Canadian workers' compensation claimants with sub-acute and chronic MSK disorders attending an outpatient occupational rehabilitation program. Three factors for the non-job attached/not working group were identified: Contemplation, Prepared for Action-Self-evaluative and Prepared for Action-Behavioural. All items related to each factor for Contemplation, and Prepared for Action-Behavioural were the same as the original items used by Franche et al. [5]. Two factors were identified for the job attached/working in some capacity group, Uncertain Maintenance and Proactive Maintenance and all items loaded onto the appropriate factor. Across the 3 validation studies that have been conducted, there were differences in readiness factors identified for the non-job attached/not-working group. However, all 3 studies consistently found 2 factors for the job attached/working in some capacity group. Further evaluation regarding the differences between the studies could provide valuable information in understanding what determinants contribute to factors identified with the non-job attached/not working group.

A statistically significant difference was found among RTW readiness stages and pain levels. Pain levels generally decreased as the RTW readiness stages progressed from not working factors to the working factors, confirming our hypotheses that earlier stages of change are associated with higher levels of pain rating. This is consistent with research findings that show

lower pain levels are associated with RTW [20]. A statistically significant difference existed between physical component summary measures and RTW readiness stages for working factors; however, no difference was found for the not working factors. Conversely, a statistically significant difference was found between RTW readiness stages and mental component summary measures for the not working factors but not for the working factors.

Physical and mental component summary measures generally improved as the RTW readiness stages progressed from not working factors to working factors confirming the study's hypotheses that earlier stages of change are associated with more compromised physical and mental health. This is consistent with research findings that suggest perceptions of better general health and higher SF-36 mental health scores resulted in higher probability of RTW [9]. A statistically significant difference existed between RTW expectations and RTW readiness stages. Our hypothesis that RTW expectation scores improve as the RTW readiness stages progress was supported with the working group but not entirely with the not working group, or between the working and not working groups. RTW expectation scores were better for the Prepared for Action-Self-evaluative group compared to Prepared for Action-Behavioural and Uncertain Maintenance Groups. Overall, our findings support the use of the Readiness for Return to Work scale for identifying stages of change in injured workers undergoing rehabilitation.

6.4 Significant Findings of the Motivational Interviewing Effectiveness Study

The findings for study 3 (chapter 5) supports the integration of MI into work rehabilitation. MI was found to be more effective than routine rehabilitation programs alone in improving RTW rates. RTW rates at program discharge were statistically better and clinically important for non-job attached workers in the intervention group. Although, a statistically

significant difference in RTW rates among job attached injured workers was not found, RTW rates were also higher among job attached injured workers in the intervention group compared to the control group.

While most randomized controlled trials generally support the efficacy of MI, the majority of studies lack proof of fidelity to MI [2]. MI adherence checks are necessary to distinguish this intervention from others or from control groups [18]. Despite widespread use of MI in various clinical and research setting, documentation regarding the integrity of MI continues to be minimal [18]. The results of study 3 are consistent with the literature reporting issues with documentation regarding MI adherence. We found documented MI adherence among clinicians in the intervention group varied substantially. However, differences in RTW rates were statistically significant for both job attached and non-job attached injured workers if the clinician documented adherence with MI, especially when RTW was the documented target behaviour. As interest in MI spreads across different disorders and populations, competent practice of MI through effective training and fidelity of the approach through MI adherence checks will become more critical [2].

6.5 Strengths and Limitations of the Cross-sectional and Clinical Trial Studies

The cross-sectional study included a large sample size for injured workers in the job attached group permitting completion of an exploratory and confirmatory factor analysis. However, due to the smaller sample size of the non-job attached group, a confirmatory factor analysis could not be completed which limits the strength of validity evidence with this group. For study 3, a pragmatic clinical context using a cluster randomized controlled trial design was used providing a fairly accurate representation of injured workers within this Canadian workers'

compensation system undergoing occupational rehabilitation. This was a rare opportunity as workers' compensation settings are rarely utilized as intervention sites in RTW research despite the wide range of benefits they provides [22]. Furthermore, no adverse effects related to the MI intervention were reported by injured workers or clinicians during or after the study. Several limitations were identified with study 3 and were described in chapter 5. First, due to the level of cognitive functioning and insight required, and extensive linguistic component necessary for MI, injured workers with brain injuries or traumatic psychological injuries, and injured workers who required the use of an interpreter were excluded from the study. While it is unknown how MI could impact RTW with these subpopulations, these typically complex cases may experience more psychosocial barriers to RTW and additional RTW interventions could be necessary. The second limitation is the unequal distribution of job attached injured workers between the intervention and control groups. This was the result of the type of RTW program 2 clinicians in the control group were involved in, which excluded non-job attached workers from the program. However, in order to maintain the benefits of randomization, these clinicians were not moved from the group they were randomly allocated to. The third limitation was the low documented adherence to the MI intervention. However, clinicians who reported full adherence had better rehabilitation and RTW outcomes when compared to non-adherent clinicians and the control group.

6.6 Considerations for Future Research

Future research assessing MI with injured workers and with other populations should evaluate factors that influence the effectiveness of MI. For example, further research is required to identify the minimum timeframe required for an effective MI session and if the effects of MI

are improved with certain practitioners more than others. Aspects of MI delivery that impact outcomes are important to understand due to the variability of effect sizes and frequency of observed significant effects [8]. This suggests MI is an effective intervention approach for various conditions and populations but the mechanisms that make MI successful are still not well understood [8]. In addition, aspects of MI delivery that influence outcomes cannot be achieved without a thorough description outlining the MI intervention training and documented fidelity of the MI approach, which is often lacking in existing MI intervention studies.

A stage-based intervention approach to RTW acknowledges that readiness for RTW can vary among injured workers and is also compatible with the growing body of evidence that supports the need for a developmental approach to RTW [19, 24]. While the results of study 3 confirmed MI could be an important addition to work rehabilitation programs, further research is required to determine what potential tools or intervention strategies are effective at different stages of behaviour change in the RTW process. For example, for injured workers who are currently working, high workplace demands [6] and negative social supports [11] significantly impact the ability to continue working. Therefore, assessment of elements in the work environment that support or hinder performance, fulfillment, and well-being [15] are critical for the success of injured workers in the Uncertain and Proactive Maintenance stages. The Work Environment Impact Scale (WEIS) is a semi-structured interview designed to gather information on psychosocial and environmental factors that either promote or diminish the possibilities of RTW [15]. Injured workers experiencing difficulty remaining at work or whose work has been interrupted by an injury, could benefit from the implementation of this approach. However, the WEIS, in addition to other potential stage based tools and interventions, will need to be evaluated through clinical research.

6.7 Conclusion

Work plays a vital role in the construction of self-identity, wellness and personal life expectations. RTW is a process and outcome that is affected by many factors at different times, and that can be measured in several ways. Identifying effective interventions for addressing psychosocial and behavioural factors associated with work-related MSK disorders has been the focus of RTW research for many years. Although understanding an injured worker's level of readiness to RTW would seem to be imperative in providing suitable psychosocial and behavioural interventions, research in this area is scarce. The applicability of MI across a variety of lifestyle problems and disease, its brief and specific interactions, and practical use in combination with other treatment methods are a few reasons why this intervention has clinical relevance in work rehabilitation practice. The results of this thesis research provide disability providers with information regarding the validity of the Readiness for RTW scale and the impact of MI on RTW rates. MI could be an important addition to work rehabilitation programs as there are currently few evidence-based, non-physical interventions to address psychosocial and behavioural barriers to recovery for workers with MSK disorders. Understanding and preventing work disability and delayed RTW requires the application of novel concepts and research designs, improved measures of RTW factors and outcomes, and translation of research findings into meaningful changes in practice. This thesis research project has evaluated an OT theory, a RTW instrument, and a client-centered intervention in hopes that it will contribute relevant information in better understanding and addressing psychosocial and behavioural barriers to recovery associated with MSK disorders.

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