

Workplace, Supervisor, Worker, and Accommodation Factors Associated with Workers' Compensation Outcomes: An Ecologic Study

Final Report

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Executive Summary

Many workplace factors affect disability and prolonged sickness absence for physical or mental ill health. These include organizational, supervisor and worker factors, and early intervention or accommodation factors. People with various disorders function well in the workplace when they are provided with appropriate work accommodations that take into account social, organizational, and interpersonal issues. Research has also shown that other organizational factors, such as organizational culture and trust in the workplace, are associated with positive disability outcomes. Supervisor and worker factors are also important predictors of return to work. Yet, few studies have been able to incorporate all of these factors to assess independent effects, controlling for other workplace factors, especially at the level of the workplace. Determining independent effect levels of various workplace factors is important to assist workplaces with prioritizing target areas for prevention and implementation of effective return-to-work practices.

We recently completed a project funded by the Workers Compensation Board of Manitoba titled “Supervisor and worker perspectives on workplace accommodations for mental health disorders”. Data from this project include both supervisor and worker perspectives on numerous workplace factors related to mental health accommodations, providing a unique opportunity for us to link with workers’ compensation board (WCB) data to examine associations between our workplace factor data and workers’ compensation outcomes at the employer-level.

The general objective of the proposed study is to determine which factors at the workplace-level (organizational, supervisor and worker characteristics, and mental health accommodation factors) are associated with workers’ compensation outcomes. Specifically, our primary aim is to determine the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the duration of lost-time claims. Secondary aims include:

- 1) Exploring conditions for the claim (i.e., mental health, musculoskeletal disorder, concussion) as an effect modifier of the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors, and the duration of lost-time claims.
- 2) Exploring industry sector as an effect modifier of the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors, and the duration of lost-time claims.
- 3) Determining associations between workplace-level organizational, supervisor and worker characteristics, accommodation factors, and the incidence of approved, denied, lost-time, and no lost-time claims.
- 4) Determining if employer non-participation in the previous study (and hence non-participation in this proposed study), is associated with workers compensation outcomes (duration of lost-time claims; and incidence of approved, denied, lost-time, and no lost-time claims) to assess the likelihood of selection bias.

What we did

This ecologic study involves a data linkage of our extant data on organizational, supervisor, worker, and mental health accommodation factors at the level of the organization with Workers Compensation Board of Manitoba outcome data (duration of lost-time claims; and incidence of approved, denied, lost-time, and no lost-time claims) for those companies approached to participate in the previous study.

Results from this study will further our understanding of associations between workplace factors (organizational, supervisor, worker, and mental health accommodation factors) and work disability (incidence and duration of claims) to assist workplaces in prioritizing their work disability prevention efforts. This project directly addresses the WCB's Scientific Research Priority on "Timely, Meaningful and Sustainable Return to Work/Stay at Work" as it will identify priority areas for primary (prevention of initial occurrence) and tertiary (reducing the time on benefits) prevention of time lost from work. Additionally, results from the data linkage will help establish the internal validity and generalizability of our findings from this and the previously completed study.

Overview of Results

First, the factors associated with workers compensation outcome – the duration of accepted lost-time claims were workers seniority, age and ability to access health care provider support; and supervisors who show concern and respect for workers, lookout for workers welfare, express appreciation and support; learn, adapt, and grow in their job; scan their environment, experiment, innovate and transform the organization through organic growth or market acquisitions; and have a positive attitude towards mental health disorders.

Secondly, the factors associated with workers compensation outcome – the incidence of accepted lost-time claims were workers stating healthcare provider support is very well and thought their healthcare provider informs about the changes in the job that are needed to return to work.

Finally, the participating employers did not differ from non-participating employers in the duration or incidence of accepted lost-time claims. These findings are important for all stakeholders, supervisors, workers and researchers as they identify important targets for intervention.

Acknowledgements

We'd like to thank the entire research team for their invaluable expertise and advice related to this project.

The project advisory team was also instrumental to this project. First, they contributed valuable advice prior to the start of the study to ensure we collected the most appropriate information. Second, they assisted in the development of messages to take away from this project. Finally, they continue to contribute through dissemination of the findings contained in this report to their networks. The project advisory and research team included:

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1. Introduction

1.1. Burden and duration of Lost-time injury

Although the Manitoba time loss injury rate has been decreasing, 4.3 time-loss injuries per 100 workers in 2006 to 3.0 injuries in 2015,(10) the province still has one of the highest rates of time loss injury in Canada according to a rough estimate using provincial populations from the census as the denominator.(11) Not only is time lost from work costly to the compensation system and employer, but also to the worker, his or her family, and our larger society.

The duration of lost-time injuries can vary depending on the health issue, healthcare, worker, compensation, and workplace factors. A cohort study of compensated back pain in Ontario in 2005 found that 22% of workers were still on benefits after 4 weeks.(12) Information readily available from the compensation system suggests that delayed recovery from work-related, compensated back pain is associated with factors such as age, physical work demands, opioid prescription, union membership, availability of a return-to-work (RTW) program, employer doubt about work-relatedness of injury, worker's recovery expectations, participation in a rehabilitation program, and communication of functional ability.(12) A systematic review of RTW after mild traumatic brain injury found that most workers had RTW within 3 to 6 months after their injury; factors associated with delayed RTW included personal and work characteristics such as lower levels of education, limited job independence and decision-making latitude and physical characteristics such as nausea or vomiting on hospital admission, extracranial injuries, and severe head/bodily pain early after injury.(13)

1.2. Factors associated with the duration of injury

Recent systematic reviews have started to identify common factors across injury types associated with positive and negative RTW outcomes.(14, 15) Positive factors include higher education and socioeconomic status, higher self-efficacy and optimistic expectations for recovery and RTW, lower severity of injury/illness, RTW coordination, and multidisciplinary interventions that include the workplace and stakeholders.(14) Factors associated with negative RTW outcomes include older age, female, overweight, higher pain or disability, depression, higher physical work demands, previous sick leave and unemployment, and activity limitations.(14, 15)

The choice of factors studied, and therefore identified, reflects the beliefs of researchers about the underlying causes of work disability.(1) We recently identified four organizational levels of assessment from the work injury and disability literature: 1) information from ill or injured workers; 2) information from the workforce as a whole; 3) assessments of supervisor attitudes; and 4) information about organizational practices and procedures.(1) Few, if any, studies have yet attempted to assess all four levels, thus limiting more complex and comprehensive views of disability and RTW.

1.2.1. Workplace factors associated with RTW

To date, the predominant workplace factors studied for workers' RTW from health problems span four categories: 1) Physical job demands, 2) Psychosocial job demands, 3) Work organization and support, and 4) Workplace beliefs and attitudes.(8, 16)

Physical job demands include high pace of work, blue- versus white-collar workers, job difficulty, exposure to vibrations, awkward postures, construction industry work, self-reported high physical work, and objective measures of high physical work (17-30). There is strong evidence that high physical job demands are positively associated with work disability.(31, 32) Physical job demands are most often self-reported by the worker.(31)

In contrast, psychosocial job demands include lack of job control, short job tenure, high job stress, high job demands, low fairness and low distributive justice, and role ambiguity.(17, 20-23, 25, 26, 33-41) Strong evidence exists for job strain, increased psychological demands, and lack of worker control as factors related to RTW, but only moderate evidence exists for lack of job control and low fairness.(32)

Work organization and support factors reported in the literature include low social support from colleagues and supervisors, few offers of job modification, limited accessibility, part-time work, low leadership quality within the workplace, and little managerial involvement.(17, 19-21, 23, 24, 26, 27, 30, 35, 37-39, 41-49) Systematic reviews have identified strong evidence for lack of social and supervisory support and moderate evidence for part-time work, poor leadership quality, and lack of managerial involvement in relation to RTW.(32)

Workplace beliefs and attitudes studied include low job satisfaction, negative feelings towards work, low occupational pride, and problematic interpersonal relations at work.(22, 23, 26, 35, 37, 45, 50) Although there is a strong evidence base for low job satisfaction,(32) associations with work disability may be more complex than what can be captured in a single job satisfaction variable given the multi-faceted nature of job satisfaction.(31)

The majority of this evidence was derived from studies using one or a small number of workplaces, one or two organizational levels of assessment as discussed earlier, and typically a focus on one particular industrial sector or one specific health issue.

1.3. Burden of no-lost-time injury

Workplace injuries and illnesses reported to workplace compensation systems can be divided into two administrative categories: those resulting in time off work and possibly health care treatment (lost-time claims); and those that do not result in time off work but require the professional skills of a health care practitioner to treat the injury (no-lost-time claims). Less research has examined no-lost-time claims compared to lost-time claims. Yet, the former claims still exert a substantial burden on the worker, the healthcare system, and the workplace. The burden of no time-loss injuries in Manitoba has almost mirrored the burden of time loss injuries over recent years.(10)

1.3.1. Factors associated with no-lost-time injury

In 2015, Smith et al. compared individual, occupational, and workplace level factors associated with no time loss injury claims.(51) They found that employees from firms with higher premium rates were more likely to report no time loss from work and workers in more physically demanding occupations were less likely to report no time loss from work.(51) However, all of the data for this study was drawn from the compensation system administrative files, severely limiting the workplace factors that could be assessed or their potential impact.

Now that workplace mental health is on the radar of workers' compensation systems, it may be that factors associated with mental health and stress in the workplace are associated with more no-lost-time claims. As there is very little research in this area, much is unknown about the drivers of no-lost-time injuries.

1.4. Assessing selection bias in studies of work disability prevention

Work disability prevention and workplace factors research depends on the cooperation and participation of employers. Participation rates among employers approached for participation in research studies are generally either quite low or not reported at all.(52) A study examining risk factors for carpal tunnel syndrome attained a participation rate of 20.5% (58 of 73 employers declined participation).(53) Reasons for non-participation included lack of interest, liability concerns, time constraints, lack of direct benefit to the employer, and company policy restraints.(53)

Lack of employer participation can result in low internal and external validity. Substantial selection bias (low internal validity) can result in biased and imprecise estimates of prevalence and incidence, and biased estimates of association. The consequences of low external validity are as obvious as they are expensive. For example, a nationally implemented intervention shown to be effective in a trial nonetheless may encounter many barriers in the dissemination process.(54) The intervention could be effective in the few companies that participated, but non-participating worksites would likely not adopt the intervention.(54)

However, other studies have found more success in recruiting worksites to participate in research studies. A study from Puget Sound in the US achieved a 44.5% response rate and found no significant differences in participation by type or size of worksite.(54) In a study specifically designed to assess employer participation bias, we found of 597 employers approached, only 17.9% consented to participate.(55) Only three variables distinguished between participating and non-participating companies: payroll and benefit expenses, number of employees, and local authority to provide consent. This suggested that only employer size may be an important factor related to participation and that the potential for selection bias may actually be quite limited.

2. Research Objectives

The general objective of the proposed study is to determine which factors at the workplace-level (organizational, supervisor and worker characteristics, and mental health accommodation factors) are associated with workers' compensation outcomes. Specifically, our primary aim is to determine the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the duration of lost-time claims. Secondary aims include:

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- 3) Determining associations between workplace-level organizational, supervisor and worker characteristics, accommodation factors, and the incidence of approved, denied, lost-time, and no lost-time claims.

- 4) Determining if employer non-participation in the previous study (and hence non-participation in this proposed study), is associated with workers compensation outcomes (duration of lost-time claims; and incidence of approved, denied, lost-time, and no lost-time claims) to assess the likelihood of selection bias.

Addressing these questions will help us to understand which workplace-level factors are mostly strongly associated with workers' compensation outcomes and will help workplaces to prioritize their work disability prevention efforts. We will also explore if the important factors vary by condition related to claim and industry sector.

3. Research Design and Framework

3.1. Study Design

We proposed a quantitative ecological (employer-level) study of workplace factors and supervisor and worker characteristics and workers' compensation (WCB) outcomes (incidence of lost- and no-lost-time claims and duration of lost-time claims). We will leverage data recently collected from a Manitoba WCB-funded study "Supervisor and worker perspectives on workplace accommodations for mental health"(9) by linking workplace-level data to WCB outcomes. Through this previous cross-sectional survey work we have data in hand from organizational, supervisor, worker, and accommodation factors from both supervisor and worker perspectives. Linking this information to WCB outcome data will allow us to identify factors potentially associated with WCB claim occurrence and duration. Identification of these factors will identify areas for employers to prioritize their work disability prevention efforts and help guide researchers to develop appropriate interventions for the workplace.

3.2. Theoretical framework

We are approaching our research questions from the perspective of the employer to aid in the identification of factors important at an organizational level that could potentially be amenable to intervention. Research related to workplace factors associated with disability has proceeded in the absence of a unified conceptual framework. To address this gap, we recently proposed three basic principles for guiding research and practice related to workplace factors.(1) These principles are displayed in Figure 1: barriers to work re-entry, aversive and appetitive factors in the work environment.

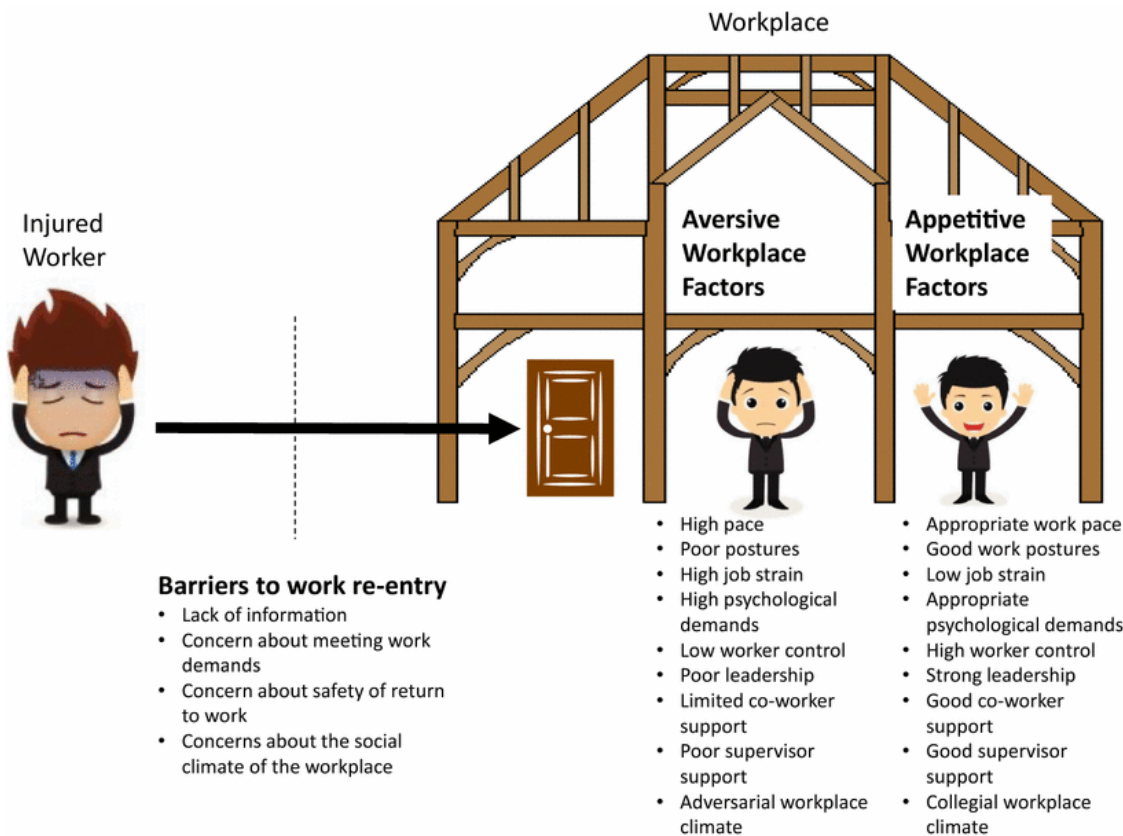


Figure 1. Three basic principles for guiding research and practice showing common workplace factors (from Kristman et al.(1))

Although our survey was not able to capture all factors listed in Figure 1, we did capture a broad spectrum of factors that relate specifically to creating a psychologically safe workplace (see sections 2.4.3.3 to 2.4.3.5). We will assess these factors at the organizational level to determine their independent effects on the incidence and duration of work disability keeping in mind our three guiding principles.

4. Survey Study Design

4.1. Study sample

Organizational data was recently collected from 18 Manitoba workplaces participating in a cross-sectional study “Supervisor and worker perspectives on workplace accommodations for mental health”.(9) The general objective of that study was to understand what factors (organizational/job, supervisor, health care provider, and worker) determine whether workplace accommodations are supported (from the perspective of supervisors) and whether workplace accommodations are received (from the perspective of workers). Data collection for that study is complete and analyses are currently underway.

Briefly, the research design included a random selection of 30 employers from Manitoba and Northwestern Ontario using a stratified selection procedure. Three businesses, individually employing at least 50 employees, were randomly selected from each of ten industrial sectors. Companies were randomly selected from a business database, InfoCan, stratified by industrial sector. Table 1 shows the distribution of participating and non-participating companies. We are proposing to use data from the 18 participating Manitoba employers for the proposed study. We will apply to other funding agencies to obtain data and funds to analyze the Ontario data.

Table 1. Distribution of participating and non-participating employers across industrial sectors and provinces

Industrial Sector	Manitoba			Northwestern Ontario		
	Participated	Couldn't contact	Declined	Participated	Couldn't contact	Declined
Agriculture	1	16	15	2	0	2
Mining	0	7	5	3	1	2
Construction	3	15	14	0	5	3
Manufacturing	3	18	15	1	3	4
Transportation	1	13	15	2	1	9

Industrial Sector	Manitoba			Northwestern Ontario		
	Participated	Couldn't contact	Declined	Participated	Couldn't contact	Declined
Wholesale	3	19	28	0	3	2
Retail & Trade	1	14	18	2	2	3
Finance	3	3	0	0	0	0
Services	1	11	12	2	2	4
Public Administration	2	11	2	1	0	0
Total	18	127	124	13	17	29

Upon employer consent for the workplace to participate in the study, all supervisors and workers were invited to participate in the appropriate survey. Invitation to participate in the study was by e-mail through the employer. If e-mail was unavailable or the employer indicated that they monitored keystrokes in the workplace, we provided the employer with paper-based surveys and postage-paid envelopes to distribute to their employees and supervisors. The e-mail invitation included a web-based Universal Resource Locator link that participants clicked to access the appropriate survey.

The study design was based on a conceptual framework hypothesizing supervisor efforts to support, recommend, or coordinate specific job accommodations are influenced by management policies, worker characteristics, information from medical providers, and the leadership style and attitudes of the supervisor (Figure 2). (58, 59)

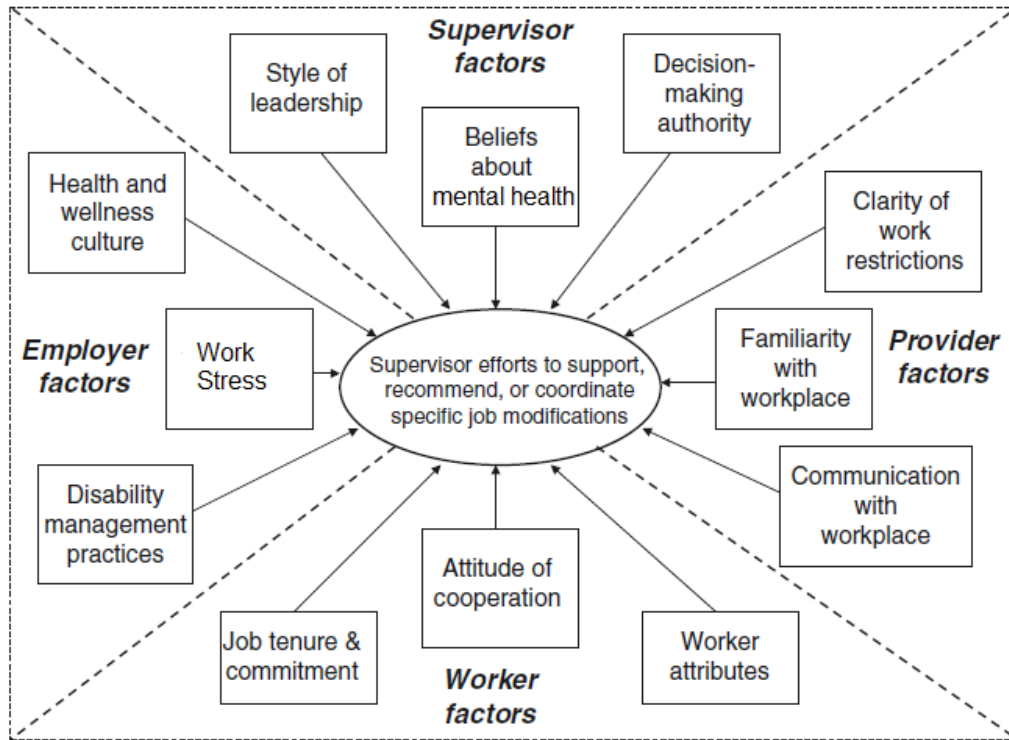


Figure 2. Conceptual framework showing potential factors influencing supervisor support for job modifications.

4.3.1. Inclusion and exclusion criteria

We invited all supervisors and workers from the randomly selected employers who agreed to participate and were willing to provide their employees with paid time to complete the survey. Participants had to be at least 18 years of age or older and employed fulltime or part-time by the selected employer. A supervisor was defined as someone who supervises at least one employee. Supervisors were identified by the employers. Higher level supervisors who supervise lower-level supervisors were eligible for participation. We only provided surveys in English, so those who could not complete them were excluded from the study. Within the Manitoba workplaces, 184 supervisors (54.9% response rate) and 381 workers (25.7% response rate) completed the survey.

5. Survey Study Measures

5.1. Workplace-level Measures (supervisor and worker perspective)

Workplace factors included in the survey came from a review of the organizational and disability management literature. Most were used in a previous study.(59-62) All were found to be valid and reliable for the supervisor population and most were previously used in worker populations. The following instruments were adapted for web-based electronic administration (the complete supervisor and worker surveys are included in Appendix 2 and 3, respectively):

5.1.1. Job accommodation

We are currently in the process of creating and validating a new job accommodation scale for mental health (JAS-MH). We are using a process similar to that for the Job Accommodation Scale (JAS) that we developed for low back pain.(59) Items for development of the new scale that were incorporated in the survey include JAS items, the Work Accommodation and Natural Support Scale (WANSS),(63) and workplace mental health accommodation questions that were used in a longitudinal cohort of employees with a prior or current mental disorder.(64)

5.1.2. Disability management

Disability management was measured using 13 questions from the Organizational Policies and Practices (OPP) Scale.(7) The OPP was developed to measure four scales: people-oriented culture, safety climate, disability management policies and practices, and ergonomic practices.(7) We selected 13 questions, all relevant to claim management and return to work, which comprise the disability management scale. The total score was computed by averaging the scores on the 13 items. These items have been shown to have high reliability (Interclass correlation $r = 0.916$).(7) Higher scores indicate better disability management. The instrument has been shown to be valid in supervisors(60, 62)and in carpal tunnel surgical candidates from Maine and in 29 industries examined in Michigan.(65)

5.1.3. Work stress

Work Stress was measured with a 12-item index of items from Karasek and Theorell(66, 67) that reflect participant's perceptions of various dimensions of work, including job security, social support, monotony, physical effort required, and extent of participation in decision-making. Higher scores indicate greater work stress. This scale has been used in the Canadian Community Health Survey, conducted by Statistics Canada, since its inception and has been shown to be valid and reliable in the Canadian population.

5.1.4. Attitude of cooperation

Attitude of cooperation was measured with the workplace social capital scale.(68) Social capital at the individual-level is an individual's perception of the shared attitudes and values among members of an organization, reciprocity, mutual respect and trust between workmates, collective action and participation in the networks at work, and trust in and trustworthiness of a supervisor. Low workplace social capital has been shown to be a predictor of depression(69) and low self-rated health.(70) An 8-item scale was used to measure the key components of social capital at the workplace. The 8-item scale is a reliable and valid measure of social capital.(68) The responses are on a 5-point scale with higher scores indicating higher individual-level social capital. The internal consistency of this measure is good (Cronbach's $\alpha = 0.87$). Supporting convergent

validity, the scale was associated with, but not redundant to, conceptually close constructs, such as procedural justice, job control, and effort-reward imbalance. The r_{wg} index, which measures the extent to which raters assign the same ratings to a single target, was 0.88, which indicates a significant within-unit agreement.

5.1.5. Leadership style

Leadership style was measured using the Leader Behavior Description Questionnaire (LBDQ).(71) The LBDQ provides measures of two important dimensions of leadership: Initiating Structure and Consideration. Initiating Structure refers to the degree to which a supervisor defines and organizes his or her role and the roles of subordinates, is oriented toward goal attainment, and establishes well-defined patterns and channels of communication.(72) Consideration refers to the degree to which a leader shows concern and respect for subordinates, looks out for their welfare, and expresses appreciation and support.(73) Originally identified in the Ohio State University leadership studies, these two constructs have been shown to be meaningful in a wide variety of supervisor-subordinate situations. A meta-analysis found that of the four existing measures of Consideration and Initiating Structure, the LBDQ had the highest validity.(74) The LBDQ is a 40-item questionnaire that results in a range of scores from 0 to 60 on each dimension. Higher scores indicate greater Structure and greater Consideration. There is a weak correlation ($r=0.36$) between Consideration and Initiating Structure on the LBDQ, and theoretically we would expect about a 0.30 correlation between the two dimensions.(74) The LBDQ has been used for research purposes in industrial, military, educational settings, and we used it previously in supervisors.(60) Fleishman(75, 76) and Fleishman, Harris and Burt(77) have used the LBDQ for use in studies of factory foreman and have found the two leader behaviour dimensions useful in evaluating the results of a supervisory training program. We made small modifications to the introduction and to the instrument for the worker survey to express the view of the subordinate answering questions about their leader instead of the internal reflections of a supervisor.

5.2. Supervisor characteristics (supervisor perspective only)

5.2.1. Supervisor autonomy

In previous qualitative work with supervisors, all supervisors cited accommodation as part of their job and an issue of concern.(78-80) However, we included a measure of supervisor autonomy as a check on this assumption. We developed three questions for this purpose. Wording of the three questions is modeled after the construct of decision latitude, a factor included in the Job Content Questionnaire.(81) The three questions ask supervisors to rate their autonomy with regard to making decisions about modified duty, having freedom to recommend specific job modifications, and “having a say” in company decisions about modified duty. We have previously used this scale with supervisors.(60)

5.2.2. Stigma

A 22-item measure, the Opening Minds Scale for Workplace Attitudes,(82) was used to assess general attitudes towards mental disorders in the workplace. The scale contains five subscales: 1) Avoidance - This subscale

examines the degree to which supervisors felt that people with mental health should be avoided; 2) Danger/Unpredictable - This subscale examines attitudes of supervisors that individuals with mental health issues are dangerous and unpredictable; 3) Work belief/Competency - This subscale examines supervisor attitudes towards the degree of work-related competency in people with mental health disorders; 4) Helping - The subscale examines the degree that supervisors have an attitude towards helping individuals with mental health disorders; and 5) Responsibility - This subscale examines the extent to which the supervisors believe that the individuals are personally responsible for their mental health disorders. Participants were asked how much they agree with each of the items on a Likert scale ranging from “strongly disagree” to “strongly agree”.

5.3. Worker and supervisor characteristics (worker perspective only)

5.3.1. Proportion of workers with a mental health disorder

Mental health disorders were determined by a battery of assessment questions used in the 2011 Canadian Community Health Survey – Mental Health supplement.(83) We assessed the 6-month period prevalence and lifetime prevalence of mood disorders, anxiety disorders, psychotic disorders, substance use disorders, and traumatic brain injuries. The CCHS found approximately 7% of respondents clinically diagnosed with depression, and 6% with an anxiety disorder.(83)

5.3.2. Supervisor support

We used one question to assess workers’ perceptions of their supervisor’s attitude towards mental illness: “In your opinion, how well does your supervisor support workers with a mental illness?”

5.3.3. Comorbidities

Comorbidities were determined using the Saskatchewan Comorbidity Scale. The Comorbidity scale is a patient-centered, self-report measure of health problems (e.g., arthritis, diabetes).(84) It is a 12-item measure asking the participant to indicate whether he or she experiences a particular health problem, and if so, what effect that problem has on his or her health (none, mild, moderate or severe). The instrument has acceptable test-retest reliability during a 10 to 14 day-period with item-specific weighted kappa coefficients above 0.56.(84) Self-reported health problems corresponded moderately with physician-reported health problems, and patient-reported co-morbidity scores were found to be correlated with health-related quality of life as measured by the SF-36.(84)

5.3.4. Disclosure and job performance

For workers who indicated a prevalent mental health condition in the past 6 months, we asked 1) for information about disclosure of their mental health condition; and 2) if their mental health condition had negatively impacted their job performance.

5.4. Potential confounders

Variables that could be considered risk factors for the WCB compensation outcomes and potentially associated with the factors described above include: survey response rates for supervisors and workers, average age of supervisors and workers, average years of experience, gender distribution within the workplace, and average education level. We have information on all of these variables from our survey data. We will use this information to assess and control for confounding influences from these variables if necessary.

5.5. Organizational-level measures

Organizational-level measures are based on mean responses from workplace participants. Table 1 in appendix 4 shows the mean and standard deviation for all measures at the workplace level from supervisor and worker perspectives. There is adequate between-employer variation in each of the factors. Where available, we will include variables for both perspectives (worker and supervisor) for the workplace factors as this will highlight whether an intervention may be needed at the supervisor or the worker level. Potential confounder information is not included in Appendix Table 1, but will be included in the available survey data.

6. Manitoba WCB data

Outcome data for this study includes WCB lost-time claim duration and incidence of approved and denied lost-time and no-lost time claims for the 269 Manitoba employers who were selected for participation in the survey study.

6.1. Duration of lost-time claims

We will request individual-level data for each lost-time claim associated with any of the 269 Manitoba employers selected for participation in the survey study. Since survey data collection started in April 2017 and was completed in April 2018, we will include any prevalent claims that overlap the period between April 1, 2017 and April 30, 2018. Claim duration will be measured in days from the date of claim initiation until claim closure or will be censored if the claim is still not closed by April 30, 2018. Data to be extracted with the claim duration information includes: claim number, firm number, date of accident, age, sex, part of body, and nature of injury. If available, we will also confirm our industrial sector and firm size information from InfoCan with WCB data.

6.2. Incidence of lost-time claims

Any incident lost-time claim request that occurred between April 1, 2017 and April 30, 2018 from any of the 269 Manitoba employers selected for the survey study will be included in the analysis.

6.2.1. Approved

The incidence rate of approved lost-time claims per employer will be calculated as the number of new claims approved between April 1, 2017 and April 30, 2018 divided by the total full time equivalent (FTE) workforce over that period. If the FTE information is not available from the Manitoba WCB, we will use the size of the workforce information from InfoCan. Additional data to be extracted with the incident information includes, where available: firm number, date of accident, age, sex, part of body, and nature of injury.

6.2.2. Denied

The incidence rate of denied lost-time claims per employer will be calculated as the number of new claims denied between April 1, 2017 and April 30, 2018 divided by the total full time equivalent (FTE) workforce over that period. If the FTE information is not available from the Manitoba WCB, we will use the number of employee information from InfoCan. Additional data to be extracted with the incident information includes, where available: firm number, date of accident, age, sex, part of body, and nature of injury.

6.3. Incidence of no-lost-time claims

Any incident no lost-time claim request that occurred between April 1, 2017 and April 30, 2018 from any of the 269 Manitoba employers selected for the survey study will be included in the analysis.

6.3.1. Approved

The incidence rate of approved no lost-time claims per employer will be calculated as the number of new non-lost time claims approved between April 1, 2017 and April 30, 2018 divided by the total full time equivalent (FTE) workforce over that period. If the FTE information is not available from the Manitoba WCB, we will use the size of the workforce information from InfoCan. Additional data to be extracted with the incident information includes, where available: firm number, date of accident, age, sex, part of body, and nature of injury.

6.3.2. Denied

The incidence of denied no lost-time claims per employer will be calculated as the number of new non-lost time claims denied between April 1, 2017 and April 30, 2018 divided by the total full time equivalent (FTE) workforce over that period. If the FTE information is not available from the Manitoba WCB, we will use the number of employee information from InfoCan. Additional data to be extracted with the incident information includes, where available: firm number, date of accident, age, sex, part of body, and nature of injury.

7. Data linkage

We will provide the Manitoba WCB with a file including the name of each of the 269 Manitoba employers that were selected for the survey study and an accompanying identification number. We will request the Manitoba WCB to extract all relevant claim information for each employer as described above. Once this is complete, the identifying employer information can be removed, and the file sent to us. We will link the Manitoba WCB claim data to our survey file information by id number.

8. Data Analysis

Initially, univariate descriptive analyses will be conducted on all variables to check for errors and examine distributions of variables. We will investigate any identified errors and correct and clean the data. We will determine the internal consistency for all scales used.

8.1. Primary objective: Cox proportional hazards models with mixed effects

To examine the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the duration of lost-time claims we will use a Cox proportional hazards model with mixed effects.⁽⁸⁶⁾ This will allow us to analyze the time to event data, including censoring, while accounting for the clustering of individuals within workplaces. Fixed effects will include age, sex, and nature of injury. Random effects will include the employer-level variables. Before fitting a multivariable model, we will examine bivariate associations between each of the factors and the outcome. All factors that are associated with the outcome with a p-value of less than or equal to 0.2 will be included in a final model. We have selected 0.2 as a conservative cut-off to ensure that we do not arbitrarily remove variables that could potentially have an effect once they are included with other variables in a model.

We will test the proportional hazards assumption in all Cox models and use stratified models if the assumptions are not met.

8.2. Secondary objectives #1 and #2: Stratified Cox proportional hazards models with mixed effects

We will run separate models by health condition and industrial sector to explore whether or not important factors associated with the duration of lost-time claims differ by health conditions (i.e., mental health vs. musculoskeletal disorders) or industrial sectors (i.e., construction vs. manufacturing).

8.3. Secondary objective #3: Poisson regression with fixed cluster-specific intercepts

To determine the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors, and the incidence of approved and denied, lost-time, and no lost-time claims we will use Poisson regression models with fixed cluster-specific intercepts.⁽⁸⁷⁾ These analyses will allow us to model clustered count data and are appropriate if the number of clusters is relatively small (18 in this case). We will run separate models for approved lost-time, denied lost-time, approved no-lost-time, and denied no-lost-time incidence.

8.4. Secondary objective #4: Simple Cox proportional hazards model and Poisson regression model

To assess the likelihood of selection bias, we will determine if employer non-participation in the previous study (and hence non-participation in this proposed study), is associated with workers compensation outcomes (duration

of lost-time claims; and incidence of approved, denied, lost-time, and no lost-time claims) to assess the likelihood of selection bias. Since the analysis is entirely at the group level (organization), there is no need to account for clustering. Therefore, a simple Cox proportional hazards model will be used for the duration of lost-time claims and Poisson regression models will be used for the incidence analyses.

9. Knowledge Transfer & Exchange

9.1. Advisory Board Meetings

The first meeting of the Advisory Board was held on June 27, 2019, at the University of Winnipeg. Some of the research team members met with staff at the Workers Compensation Board to discuss the available outcome data and start the data extraction process. At our final online zoom meeting of the advisory board committee members on April 20, 2021, and April 21, 2021, the research team presented the preliminary results and the board assisted in the development of messages to take away from this project. On May 18, 2021, a follow up zoom meeting was held with a KTE Manager to discuss next steps suggested during the project advisory committee zoom meetings. By September 15, 2021, two infographics that can be utilized by workplace stakeholders and researchers was submitted to the project advisory committee members for review and feedback. Finally, they continue to contribute through dissemination of the findings contained in this report to their networks. The project advisory team included:

- Michelle Brunette, WCB MB
- Dr. William S Shaw, University of Connecticut
- Ela Partyka, Canadian Mental Health Association
- Ms. Margaret Cernigoj, Ministry of Labour
- Allan Beach, Manitoba Government and General Employees' Union
- Dr. Karen Harlos, University of Winnipeg
- Susan Tremblay, Manitoba Nurses Union
- Dr. Marc Corbiere, Université du Québec à Montréal
- Steve Mantis, Ontario Network of Injured Workers Groups
- Sara Macdonald, Institute for Work and Health

9.2. Presentations

9.2.1. EPID@Work Plenary

On April 14, 2021, Vicki Kristman and Mannila Sandhu presented the preliminary results at the “Spring EPID@Work Talks” at Lakehead University. The presentation was titled “Workplace, Supervisor, Worker, and Accommodation Factors Associated with Workers' Compensation Outcomes: An Ecologic Study. Ms. Mannila Sandhu, MSc (Computer Sciences), Research Assistant, EPID@Work Research Institute & Dr. Vicki Kristman, Associate Professor, Department of Health Sciences, Lakehead University; Director, EPID@Work Research Institute”.

9.2.2. Conference Presentations

On June 27, 2023, Mannila Sandhu presented the final findings in the form of a poster presentation at the 2023 CSEB (Canadian Society for Epidemiology and Biostatistics) conference in Halifax. The poster presentation was titled “Workplace Factors Associated with Workers Compensation Outcomes: an Ecological Study”, Vicki L. Kristman PhD.^{1,2}, Mannila Sandhu MSc.¹, Marc Corbière PhD.³, William S. Shaw PhD.⁴, Karen Harlos PhD.⁵.

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4. Division of Occupational and Environmental Medicine, University of Connecticut, Farmington, Connecticut, USA

5. Department of Business and Administration, University of Winnipeg, Winnipeg, Manitoba, Canada

9.2.3. WCB Manitoba and SAFE Work staff

We will be presenting the final findings of this study to the WCB Manitoba and SAFE Work staff in September 2023.

9.3. Journal publication

Journal publications are also still in progress. As peer-review in academic journals can take a considerable amount of time, we are still in the process of publishing articles based on the material in this final report. Unfortunately, payment to the journals can not occur until the manuscripts are accepted for publication. We will continue to seek publication of these articles and will inform the Manitoba WCB before these are to be published.

10. Results

Shorter duration of claims for workers who had lower seniority, were young and could access healthcare provider support. Shorter duration of claims for supervisors who show concern and respect for workers, lookout for workers welfare, express appreciation, and support; learn, adapt, and grow in their job; scan their environment, experiment, innovate and transform the organization through organic growth or market acquisitions; and have a positive attitude towards mental health disorders. Fewer incidence claims for workers who stated that the healthcare provider support is very well and thought that their healthcare provider informs about the changes in the job that are needed to return to work. Finally, the participating employers did not differ from non-participating employers in the duration or incidence of accepted lost-time claims. However, among the non-participating employers, the ones with No response have significantly higher rate of accepted lost-time claims than the employers who Declined to participate in the study.

10.1. Study data

Data collected from a Manitoba WCB-funded study “Supervisor and worker perspectives on workplace accommodations for mental health” was used to prepare exposure data by calculating the employer-level mean or percentage of the responses from the survey questions addressing workplace-level organizational, supervisor and worker characteristics and accommodation factors. Manitoba WCB claims data was used to prepare the outcome data by calculating the average duration of lost-time claims at the employer-level that overlapped the period between January 1, 2014, and December 31, 2018. We used the Cross-sectional survey data to identify our exposure variables and the WCB Manitoba data for the outcome variables. From the survey study in 2018, 366 supervisors along with 1062 workers within the 18 Manitoba Employers completed the surveys. And we were able to collect claim data on 4977 employees across 12/18 participating and 164/251 non-participating employers with claim information overlapping the period January 1, 2014, and December 31, 2018. Employers had an average of 28 approved lost-time claims ranging between 1 and 371. Data linkage using exposure and outcome data was only possible for the participating employers (n=18). Of these 6 employers had no claim data, leaving us with 12 employers which restricted our proposed multivariable analysis. We were unable to link the exposure data to the outcome data for the non-participating employers because of the lack of survey data. We were unable to link the Manitoba WCB claim data to our survey file information by id number as proposed before because the survey population may or may not be the ones whose claim information we have. Manitoba WCB claims data was also used to prepare the outcome data by calculating the incidence of approved lost-time claims at the employer-level (n=178). We were only able to examine associations between workplace-level organizational, supervisor and worker characteristics, accommodation factors, and the incidence of approved lost-time claims. There were not enough denied lost-time (n=5), nor no-lost-time claims (n=13) in the employers studied to allow us to model these outcomes. There was also insufficient data to examine no-lost-time claims (n=212). 4977 approved lost-time claims among 176 Manitoba employers that overlapped the period between January 1, 2014, and December 31, 2018, were analyzed for adequate statistical power for our secondary objective #4.

10.2. Primary Objective: Factors associated with the Duration of lost-time claims

To determine the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the duration of lost-time claims.

The mean or percentage of the survey responses and the average duration of lost-time claims at the employer-level was calculated using a combination of Stata's *tabulate* and *summarize* commands. Bivariable linear regression was used on our exposure variables. Variables with a p-value of less than 0.05 were considered statistically significant to explore the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the duration of lost-time claims. Whereas for the multivariable regression model, variables with a p-value of less than 0.2 were selected. We have selected 0.2 as a conservative cut-off to ensure that we do not arbitrarily remove variables that could potentially affect once they are included with other variables in a model. Using the Pearson correlation matrix, two sets of variables (12 and 6) were finalized to achieve the final model. Using backward stepwise regression, variables with the highest variance inflation factor or p-value were dropped. The difference between nested models was tested using the likelihood ratio test to find the best model fit. .

On comparing these nested models using the Akaike information criterion (AIC) and Bayesian information criterion (BIC), the model with the highest R^2 and minimum AIC and BIC was selected.

Table 1. Bivariable linear regression results of the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the duration of lost-time claims

Category	Variable	Regression Coefficient ^a	Standard Error	R ²	Significance
Supervisor factors	Supervisor OCP-dev ^b	-8.603	3.502	0.376	<0.05
	Supervisor LBDQ-C ^c	-1.825	0.730	0.385	<0.05
Worker characteristics	Worker Seniority ^d	2.396	0.758	0.500	<0.01
Provider factors	Worker HCP ^e Support	-0.264	0.101	0.431	<0.05

- Dependent Variable: the duration of lost-time claims
- Organizational Culture Profile –Developmental culture - Higher scores indicating stronger membership to the culture types.
- Leadership Behaviour Description Questionnaire – Consideration
- Years worked for the same employer
- Percentage of workers stating Health Care Provider support is very well or well

Table 2. Multivariable linear regression results of the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the duration of lost-time claims

Model	Coefficients ^a						
	Unstandardized Coefficients		Standardized Coefficients	t	Significance	95% Confidence Interval for b	
	b	std. error	beta			lower bound	upper bound
1 (Constant)	-90.367	30.650		-2.95	<0.05	-159.702	-21.032
Worker age	1.214	0.463	0.546	2.62	<0.05	0.166	2.261
Supervisor OMSWA ^b	1.477	0.566	0.543	2.61	<0.05	0.196	2.757

- Dependent Variable: the duration of lost-time claims
- Opening Minds Scale for Workplace Attitudes - Lower scores indicate more positive attitudes towards mental health disorders in the workplace

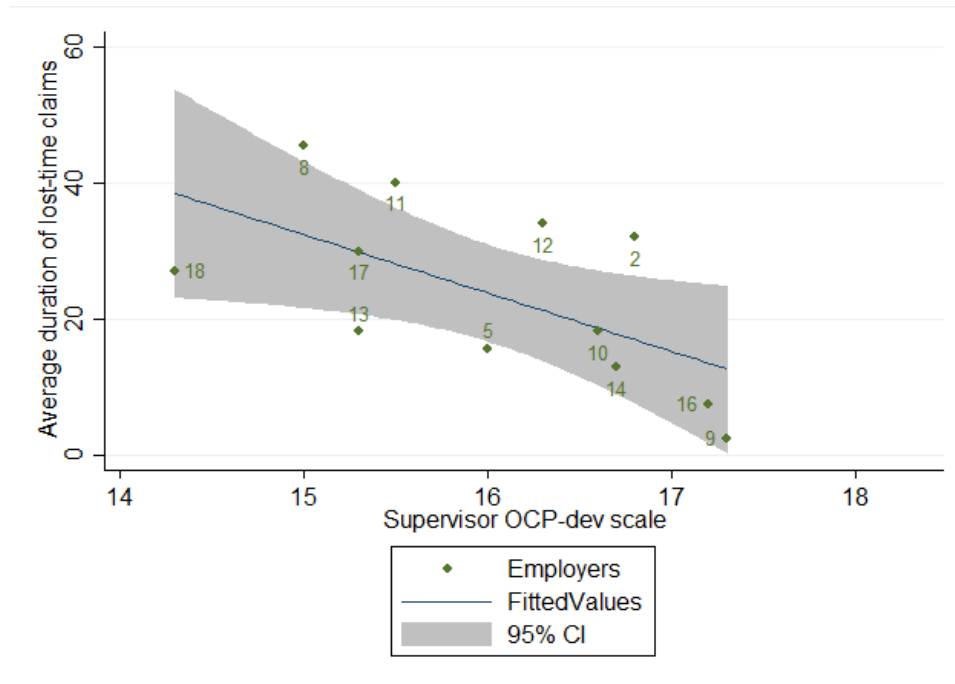


Figure 1. Bivariable linear regression results of the association between workplace-level factor – Supervisor OCP-dev scale and the duration of lost-time claims

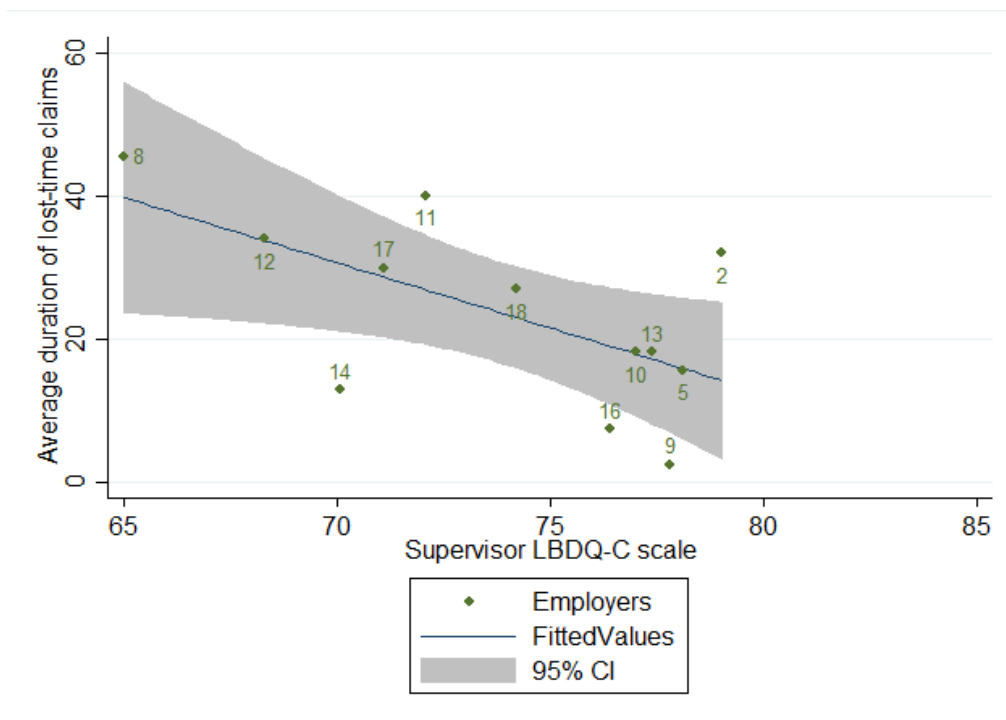


Figure 2. Bivariable linear regression results of the association between workplace-level factor – Supervisor LBDQ-C scale and the duration of lost-time claims

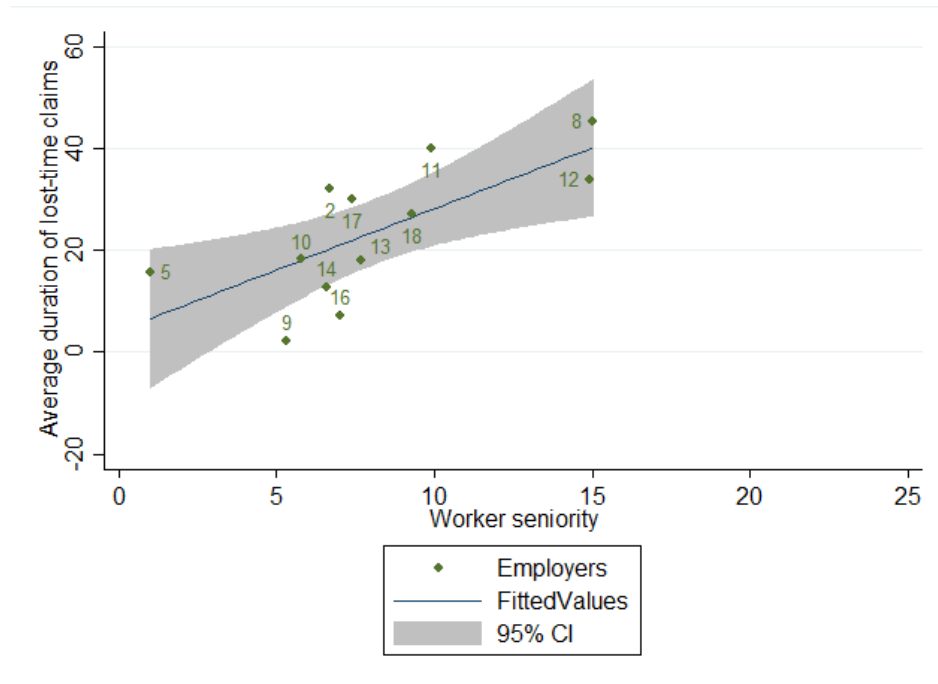


Figure 3. Bivariable linear regression results of the association between workplace-level factor – Worker seniority and the duration of lost-time claims

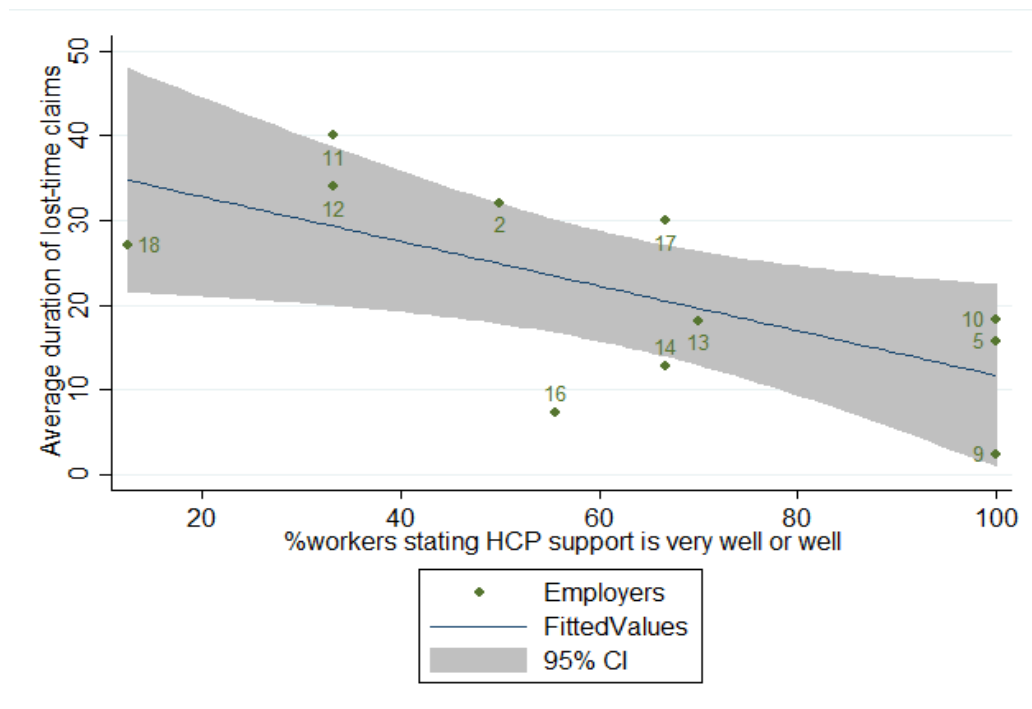


Figure 4. Bivariable linear regression results of the association between workplace-level factor – % workers stating HCP support is very well or well and the duration of lost-time claims

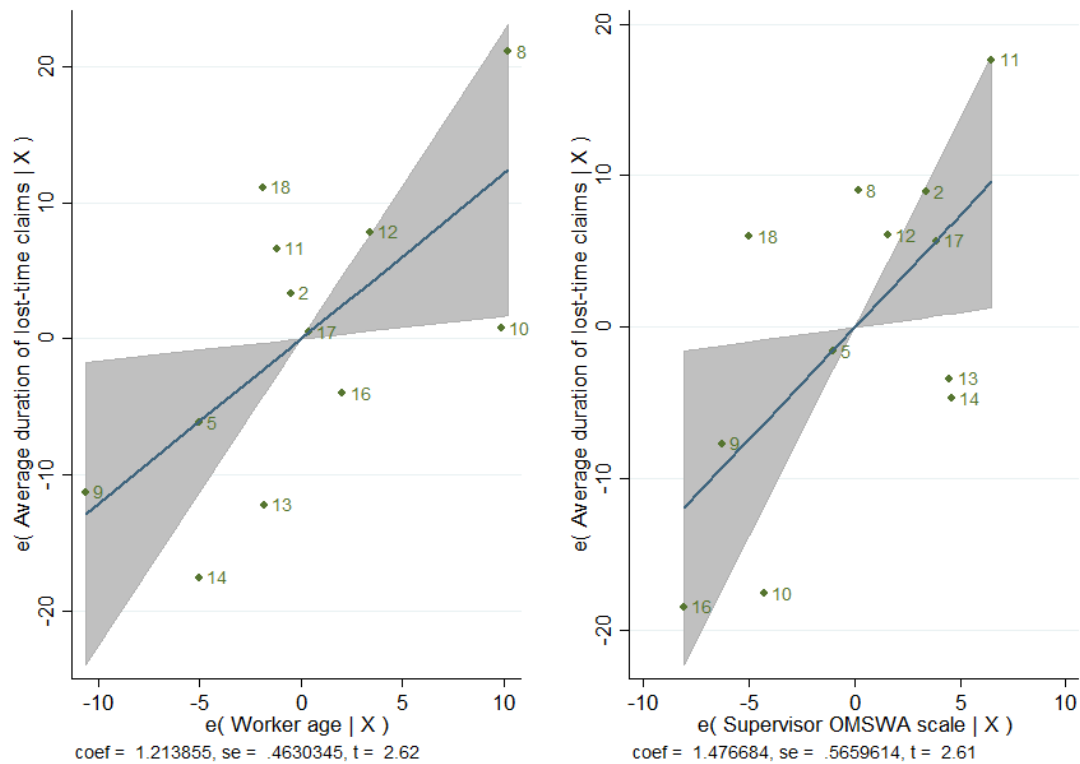


Figure 5. Added-variable plot for every regressor in our multivariable linear regression model

Bivariable and multivariable regression analyses were conducted to determine the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the duration of lost-time claims. Different variables were explored to explain the variation in the duration of lost-time claims. Tables 1 and 2 summarize the Bivariable and multivariable regression analysis results for the significant variables. As can be seen in Table 1, the supervisor Organizational Culture Profile –Developmental culture scale (Figure 1) and Leadership Behaviour Description Questionnaire – Consideration scale (Figure 2) along with the percentage of workers stating Health Care Provider support is very well or well (Figure 3) had significant negative regression weights, indicating employers with lower scores on these scales were expected to have a higher duration of lost-time claims. Whereas workers’ seniority (Figure 4) that is the years worked for the same employer had significant positive regression weights, indicating employers with higher scores on this factor were expected to have a higher duration of lost-time claims. The multivariable regression model with two predictors produced $R^2 = .611$, $F(2, 9) = 7.06$, $p < .05$, meaning that approximately 61% of the variability in the duration of lost-time claims is accounted for by the variables (Worker age and Supervisor OMSWA) in the model. Both sets of variables (12 and 6) produced the same final model. As can be seen in Table 2, Worker age and Supervisor Opening Minds Scale for Workplace Attitudes had significant positive regression weights, indicating employers with higher scores on these scales were expected to have a higher duration of lost-time claims, after controlling for the other variables in the model. However, due to the available sample size and the added variable plot (Figure 5) indicating presence of outliers, the multivariable regression model restricts

what can be reasonably interpreted from the bivariable regression results and influences the partial correlation of our regressor of interest.

10.3. Secondary Objective #1 and #2: Factors associated with the Duration of lost-time claims where conditions of the claim and industry sector act as an effect modifier

Exploring conditions for the claim (i.e., mental health, musculoskeletal disorder, concussion) and the industry sector as an effect modifier of the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors, and the duration of lost-time claims.

We were unable to explore the condition for the claim as an effect modifier since there was not a clear set of variables that would allow us to accurately identify the condition of the claim. The Psychological Condition variable only had 24 (0.45%) observations, and therefore was not able to be used for this purpose.

We were also unable to explore Industry Sector as an effect modifier since data linkage using exposure and outcome data was only possible for the participating employers (n=18). Of these 6 employers had no claim data, leaving us with 12 employers which restricted our proposed analysis.

10.4. Secondary Objective #3: Factors associated with the Incidence of lost-time claims

Determining associations between workplace-level organizational, supervisor and worker characteristics, accommodation factors, and the incidence of approved, denied, lost-time, and no lost-time claims.

The mean or percentage of the survey responses at the employer-level was calculated using a combination of Stata's *tabulate* and *summarize* commands. The incidence of approved lost-time claims for participating employers was calculated using Stata *stptime* command that calculates person-time and incidence rates. Bivariable linear regression was used on our exposure variables. Variables with a p-value of less than 0.05 were considered statistically significant to explore the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the incidence of approved lost-time claims. Whereas for the multivariable regression model, variables with a p-value of less than 0.2 were selected. We have selected 0.2 as a conservative cut-off to ensure that we do not arbitrarily remove variables that could potentially affect once they are included with other variables in a model. Using manual backward stepwise regression, variables with the highest variance inflation factor or p-value were dropped. The difference between nested models was tested using the likelihood ratio test to find the best model fit. On comparing these nested models using the Akaike information criterion (AIC) and Bayesian information criterion (BIC), the model with the highest R^2 and minimum AIC and BIC was selected. On checking for significant bias, we detected one employer as an outlier which leads us to produce two different final models, one with the outlier (n=12) and the other without the outlier (n=11). We were unable to use the proposed Poisson regression model with fixed cluster-specific intercepts to model clustered count data due to available sample size restrictions.

Table 3. Bivariable analysis and comparison between multivariable linear regression models (w/ and w/o outlier) using the AIC and BIC to determine associations between workplace-level factors, and the incidence of approved lost-time claims

Coefficients ^a				
Category	Variable	Bivariable analysis	Multivariable analysis	
			Model 1 (with outlier)	Model 2 (without outlier)
Worker characteristic	1 (Constant)		0.224(0.114)	-0.178(0.100)
	Worker age	-0.012(0.005)	-0.0057(0.0023)	
Provider factors	Male worker	-0.002(0.001)	-0.0006(0.0004)	
	Worker WRK ^b Importance	0.003(0.001)	0.0027(0.0005)**	
	Worker HCP ^c Support	0.002(0.001)	0.0017(0.0004)**	
	Supervisor MC ^d accommodation	-0.002(0.001)	-0.0011 (0.0003)*	
Supervisor factors	Supervisor JASMH-WS ^e	0.031(0.022)		-0.0224(0.0104)
	Supervisor OCP-dev ^f	0.022(0.010)		0.0204(0.0040)**
	Supervisor OMSWA ^g	-0.004(0.002)		0.0027(0.0015)
Supervisor characteristic	Male supervisor	-0.0004(0.0002)		-0.0012(0.0002)**
Worker characteristic	Worker seniority ^h	-0.004(0.002)		-0.0079(0.0014)**
N			11	11
R ²			0.967	0.952
adj. R ²			0.933	0.904
AIC			-42.25	-65.83
BIC			-39.86	-63.45
rmse			0.0305	0.0104
df_m			5	5

- Dependent Variable: the incidence of approved lost-time claims
- Percentage of workers who think it is seldom (less than 50% of the time) important that your health care provider tells you what work restrictions or changes in the job are needed to allow you to remain at or return to work
- Percentage of workers stating Health Care Provider support is very well or well
- Percentage of supervisors who sometimes (50% of the time or more) require medical confirmation of functional limitations to provide an accommodation
- Job Accommodation Scale for Mental Health - subscale covering accommodations related to the Work Schedule - Higher scores indicate a greater likelihood to provide accommodations to workers with MHD
- Organizational Culture Profile –Developmental culture - Higher scores indicating stronger membership to the culture types
- Opening Minds Scale for Workplace Attitudes - Lower scores indicate more positive attitudes towards mental health disorders in the workplace
- Years worked for the same employer

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Bivariable and multivariable regression analyses were conducted to determine the association between workplace-level organizational, supervisor and worker characteristics, accommodation factors and the incidence of approved lost-time claims. During bivariable linear regression analyses, different variables were explored to explain the variation in the incidence of approved lost-time claims but none were statistically significant with a p-value less than 0.05. Whereas for the multivariable regression model, variables with a p-value of less than 0.2 were selected as stated before. Two final non-nested models, one with outlier and other without outlier were achieved, however, due to the available sample size, these multivariable regression models restricted what could have been reasonably interpreted from the bivariable regression results. Table 3 summarizes the Bivariable and multivariable regression analysis results for the significant variables in the models. As can be seen in Table 3 for Model 1, the percentage of supervisors who sometimes (50% of the time or more) require medical confirmation of functional limitations to provide an accommodation had significant negative regression weights, indicating employers with lower scores on these scales were expected to have a higher incidence of approved lost-time claims. Whereas the percentage of workers who think it is seldom (less than 50% of the time) important that your health care provider tells you what work restrictions or changes in the job are needed to allow you to remain at or return to work and the percentage of workers stating Health Care Provider support is very well or well had significant positive regression weights, indicating employers with higher scores on this factor were expected to have a higher incidence of approved lost-time claims. This multivariable regression model with five predictors produced $R^2 = .967$, $F(5, 5) = 28.99$, $p < .01$, meaning that approximately 97% of the variability in the incidence of approved lost-time claims is accounted for by the variables in the model. On the other hand, for Model 2, male supervisors along with workers seniority that is the years worked for the same employer had significant negative regression weights, indicating employers with lower scores on this factor were expected to have a higher duration of lost-time claims. Whereas supervisors' Organizational Culture Profile –Developmental culture (OCP-dev) scale had significant positive regression weights, indicating employers with higher scores on this factor were expected to have a higher incidence of approved lost-time claims. This multivariable regression model with five predictors produced $R^2 = .952$, $F(5, 5) = 19.94$, $p < .01$, meaning that approximately 61% of the variability in the incidence of approved lost-time claims is accounted for by the variables in the model. On comparing our models using the Akaike information criterion (AIC) and Bayesian information criterion (BIC), the model with the highest R^2 and minimum AIC and BIC was selected which is Model 1 which restricts interpretation due to available sample size and outlier bias.

10.5. Secondary Objective #4: Likelihood of selection bias

Determining if employer non-participation in the previous study (and hence non-participation in this proposed study), is associated with workers' compensation outcomes (duration of lost-time claims; and incidence of approved, denied, lost-time, and no lost-time claims) to assess the likelihood of selection bias.

Simple Cox proportional hazards model is used for the duration of lost-time claims and a negative binomial regression model is used for the incidence analyses. Initially, the Poisson regression model was proposed for incidence analyses but due to overdispersion in the data, the negative binomial regression model is a preferred statistical choice. Not only employer non-participation in the study is analyzed but other variables of interest (female gender, industry sector, current age, current weekly salary, injury type, injury body part group, injury event group, injury nature group, injury source group, occupation classification and stickman group) as well. As an estimate of the baseline hazard function, both Breslow and Efron partial likelihoods are estimated for the Simple Cox

proportional hazards model (Table 4). The Table 5 provides the estimated rate ratio comparing “No Response” to “Declined”, “Participated” to “No Response”, “Participated” to “Declined” and “Participated” to “Declined + No Response” employers respectively, given the other variables are held constant in the model.

Table 4. Simple Cox proportional hazards model results with Breslow and Efron partial likelihoods estimates to determine if employer non-participation in the previous study is associated with the duration of lost-time claims; to assess the likelihood of selection bias

Variable ^a	Breslow				Efron			
	hazard ratio exp (β_a)	Significance	95% Confidence Interval.		hazard ratio exp (β_a)	Significance	95% Confidence Interval	
			lower bound	upper bound			lower bound	upper bound
participating company LR ^b statistic	1.11	0.141	0.965	1.284	1.12	0.122	0.970	1.291
	2.10 (p = 0.1476)				2.31 (p = 0.1288)			

a. duration of lost-time claims

b. Likelihood ratio

Table 5. Negative binomial regression model results to determine if employer non-participation in the previous study (and hence non-participation in this proposed study) and other factors of interest are associated with the incidence of approved lost-time claims; to assess the likelihood of selection bias

Frequency table

#Employers	#Claims
1. Participated = 12	1. Participated = 191
2. Declined = 91	2. Declined = 2,492
3. No Response = 75	3. No Response = 2,619

Comparison table (IRR^{bc})

“No Response” vs “Declined”	“Participated” vs “No Response”	“Participated” vs “Declined”	“Participated” vs “Declined + No Response”
0.712 ^{***} (0.062)	1.004 ^{NS} (0.243)	1.410 ^{NS} (0.342)	0.832 ^{NS} (0.198)
a. Dependent Variable: Duration of accepted lost-time claims. b. Incident rate ratio c. Exponentiated coefficients; Standard errors in parentheses NS Not Significant, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$			

As can be seen in Tables 9, we did not find any statistically significant differences, suggesting that participating employers were not that different from non-participating employers with respect to duration of approved lost-time claims. In Table 10 “No Response” compared to “Declined” employers, while holding the other variable constant in

the model, are significantly expected to have a rate 0.712 times greater for accepted loss-time claims. Whereas on comparing “Participated” to “No Response”, “Participated” to “Declined” and “Participated” to “Declined + No Response” employers respectively, while holding the other variable constant in the model, are not significantly expected to have a rate 1.004, 1.410 and 0.832 times respectively greater for accepted loss-time claims. Participating employers are not different from non-participating (No Response & Declined) employers. However, among the non-participating employers, the ones with No response have significantly higher rate of accepted lost-time claims than the employers who Declined to participate in the study.