# Evidence-Based Strategies in Occupational Health: Applying Meta-Analytic and Qualitative Methods to Identify and Understand Sickness Absence Among Nurses and Health Care Aides with Considerations for Northeastern Ontario

by

Basem Gohar

A thesis submitted in partial fulfillment
of requirements for the degree of
Doctor of Philosophy (PhD) in Interdisciplinary Rural and Northern Health

The Faculty of Graduate Studies
Laurentian University
Sudbury, Ontario, Canada

**THESIS DEFENCE COMMITTEE/COMITÉ DE SOUTENANCE DE THÈSE**
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Faculty of Graduate Studies/Faculté des études supérieures

| | |
|---|---|
| Title of Thesis<br>Titre de la thèse | Evidence-Based Strategies in Occupational Health: Applying Meta-analytic and Qualitative Methods to Identify and Understand Sickness Absence Among Nurses and Health Care Aides with Considerations for Northeastern Ontario |
| Name of Candidate<br>Nom du candidat | Gohar, Basem |
| Degree<br>Diplôme | Doctor of Philosophy |
| Department/Program<br>Département/Programme | Rural and Northern Health |
| Date of Defence<br>Date de la soutenance | December 17, 2018 |

**APPROVED/APPROUVÉ**

Thesis Examiners/Examinateurs de thèse:

Dr. Michel Larivière
(Supervisor/Directeur(trice) de thèse)

Dr. Elizabeth Wenghofer
(Committee member/Membre du comité)

Dr. Nancy Lightfoot
(Committee member/Membre du comité)

Dr. Céline Larivière
(Committee member/Membre du comité)

Dr. Melanie Lavoie-Tremblay
(External Examiner/Examinateur externe)

Dr. Sylvain Grenier
(Internal Examiner/Examinateur interne)

Approved for the Faculty of Graduate Studies
Approuvé pour la Faculté des études supérieures
Dr. David Lesbarrères
Monsieur David Lesbarrères
Dean, Faculty of Graduate Studies
Doyen, Faculté des études supérieures

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## Abstract

*Purpose:* Compared to other employees, nurses and health care aides (HCAs) have the highest sickness absence rates in Canada yet the phenomenon remains insufficiently studied. Furthermore, the potential influence of geography on sickness absence has received scant attention. Guided by the Evidence-Based Practice in Occupational Health Psychology framework, this investigation aimed to identify factors associated with sickness absence, understand how they occur, and determine factors that may be specific to communities in northeastern Ontario.

*Methods:* A systematic review identified relevant studies through structured search strategies, article screening, and quality testing. Pooled statistics in the form of odds ratios and confidence intervals were computed. Follow-up analyses examined heterogeneity ($Q$& $I^2$). Qualitatively, focus group sessions were held with registered nurses (n= 6), registered practical nurses (n= 4), HCAs (n= 5), and key informants specialized in nursing, occupational health, disability management, and rehabilitation (n= 5). Nursing personnel were recruited from hospitals and long-term care facilities. Narrative data were analyzed using thematic analysis.

*Results:* Meta-analytic searches yielded 812 studies, of which 27 met eligibility, and 11 variables that influenced the odds of sickness absence in a statistically significant manner ($p< .05$). Variables include: sex, occupation, health rating, previous sick leave, musculoskeletal pain, poor mental health, fatigue, night shifts, pediatric and psychiatric units, increased occupational demand, and work support. Poor health rating was highly heterogeneous ($p< .05$; $I^2= 82.77\%$). Thematic analysis revealed four primary themes: (1) Organizational factors including exposure to infectious diseases, shift work, safety

climate, and work setting; (2) the jobs' physical impact, mainly musculoskeletal pain; (3) psychological/mental impact including guilt, anxiety, and burnout; and (4) factors unique to northeastern Ontario including poor weather and road conditions, especially for HCAs providing home care, and the limited opportunity of interconnected health care networks where employers make staff available during worker shortages. Factors leading to sickness absence were described, with staff shortage serving as an important underlying contributor.

*Conclusion:* This investigation points to the complexity and intricacy of factors influencing sickness absences. The qualitative results helped deepen the understanding of the quantitative findings, while considering northern-specific factors. Several concerns were attributed to staff shortages.

**Keywords:** sickness absence, nurses, health care aides, meta-analysis, focus groups, thematic analysis

## Statement of Co-Authorship

I declare that this thesis includes materials that are the result of joint research collaborations. The following individuals contributed to the publishable chapters of this thesis:

CHAPTER 2:
Gohar B, Larivière M, Lightfoot N, Wenghofer E, Larivière C, Nowrouzi-Kia B. *A Meta-Analysis of Demographic, Lifestyle, and Physical Health Factors as Possible Predictors of Sickness Absence Among Nursing Staff.*

CHAPTER 3:
Gohar B, Larivière M, Lightfoot N, Wenghofer E, Larivière C, Nowrouzi-Kia B. *A Meta-Analysis of Demographic, Lifestyle, and Physical Health Factors as Possible Predictors of Sickness Absence Among Nursing Staff.*

CHAPTER 4:
Gohar B, Larivière M, Lightfoot N, Wenghofer E, Larivière C. *Understanding Sickness Absence in the Nursing Profession: Insights from Key Informants, Nurses, and Personal Support Workers in Northeastern Ontario.*

B.G. was responsible for the initiation of this project. He developed the research questions, acquired the data, conducted the data analysis, and wrote the chapters. M.L. was the doctoral supervisor and provided feedback and revisions on several drafts of each chapter. He also determined the thesis topic, methodology and application of the findings in terms of potential instruments. N.L., E.W., and C.L. were the committee members of this thesis. They contributed significantly to the broader framework of the study, the implications of the research, and the revision of each chapter. B.N. contributed significantly to the former two chapters, specifically with the quality assessment and analysis of the meta-analytic studies.

I am aware of Laurentian University's Policy on Authorship and I certify that I have properly acknowledged the contribution of other researchers to my thesis. I certify that this thesis, and the research to which it refers, is the product of my own work.

## Acknowledgements

While writing this section, I quickly realized that this journey is soon coming to an end, a journey during which I faced many obstacles, but also enjoyed great opportunities. First and foremost, I would like to thank the Lord, Jesus Christ who helped me through each step of this undertaking.

I am deeply indebted to the Ontario Graduate Scholarship (OGS) Program along with Laurentian University's academic and community partners who supported me financially during my doctoral studies. Through their support, I was able to complete my research and present my findings internationally. Specifically, a special thanks goes out to the Faculty of Health, Graduate Studies, the School of Rural & Northern Health (including Pitblado Award), the Centre for Research in Occupational Safety & Health (including Acclaim Ability Management Fellowship, and UA Local Fellowship), and the Goodman School of Mines.

I would also like to express my sincerest gratitude to the people who helped me reach this juncture of my academic career. Dr. Michel Larivière, you have been instrumental to my professional and personal development. Since taking your PHED4516 class over 10 years ago, you have been, and continue to be, my role model! Dr. Céline Larivière, your feedback and attention to detail in this undertaking was greatly appreciated. Also, thank you for your sound career advice over the years. Dr. Lightfoot, thank you for your guidance and for helping me step out of my comfort zone and learn more about qualitative methodologies. Also, thank you for your words of encouragement that helped me finish this thesis. To Dr. Elizabeth Wenghofer, thank you for your

support as an advisor and program director. You helped me dig deeper in my writing and appreciate the power of conceptual frameworks in guiding research. Thank you for being a great advocate for all the IRNH students.

To my colleague and friend, Dr. Behdin Nowrouzi-Kia, your support with the meta-analysis, specifically in quality assessments and the overall statistical analysis is greatly appreciated!

To my sister, Dr. Dina Gohar-Soliman, thanks for always reminding me to dream big! To my parents, Farouk and Oriette, your love and support are simply immeasurable. Through my ups and downs, you remained by my side. Therefore, I would like to dedicate this thesis to you! Finally, to my wife and best friend, Christine, thank you for your love and patience. You are my rock. I love you!

## Table of Contents

## List of Tables

**CHAPTER 2**



**CHAPTER 3**

## List of Figures

**CHAPTER 1**



**CHAPTER 5**

## List of Appendices

# CHAPTER 1:

# Introduction

## 1. 1 Introduction to the Study

A variety of occupational health and safety interventions, policies, and guidelines have been implemented over the past two decades to reduce the risks of injury, illness and absenteeism.[1-4] Despite the improvement of employees' overall health and safety in recent years, some issues remain problematic in the workplace. The most recent statistics (2011) from the Canadian workforce reveals that health care employees have the highest workplace absence rates among all full-time Canadian employees.[5] They had the highest number of illness and disability incidents compared to all other industries combined (8.0% versus 5.9%). Additionally, they had the highest average of days lost per year in comparison to any other sector (11.8 versus 7.7) due to such events. Health care employees, specifically nurses and personal support workers (PSWs) who will be referred to hereafter as health care aides (HCAs) until the Methods section, experienced the highest incident rates of illness and disability (10.6% and 10.8%, respectively), as well as having the longest average of days lost per year (13.7 and 14.7, respectively).[5] These findings could be of particular concern for more sparsely populated areas such as the northeast region of Ontario especially since health care is expected to be one of the fastest growing employment sectors.[6-7] As an example, between 2008 and 2012, the largest employment sector was health care and among those employees, over 50% were nurses and HCAs.[8]

While several researchers have attempted to understand the correlates of sickness-related absence among nursing personnel through prospective studies and systematic

reviews, sickness absence is still poorly understood in this worker population.[9] This could be due to the complexity of the physical, interpersonal, and occupational characteristics that cause injury and illness in these workers. Irrespective of the reason, there are no nursing-specific studies that have examined predictors of sickness in the literature using meta-analysis. Quantitatively amalgamating pertinent literature could offer insight into the conflicting findings between studies and better inform researchers and policy makers of the factors that relate sickness absence.[10] In addition to identifying factors linked to sickness absence, understanding how such factors may lead to sickness absence is also important in order to apply preventative measures. Finally, with its large geography and low population as well as limited research in northeastern Ontario, it would seem relevant to explore factors related to sickness absence from northern (northeastern) context.

### 1.2. Purpose of the Study

The main purpose of this investigation was to better understand the correlates of sickness absence among nurses and HCAs with the eventual objective of assessing the level of risk in the workplace, which in turn might help guide prevention and intervention strategies. It is important to note that efforts from this undertaking did not focus on developing a risk assessment tool. Rather, they focused on identifying predictors associated with lost time, which could be used in future research for constructing psychometrically sound risk assessment tools. An evidence-based approach is required. Evidence-based strategies would include assessing previous work, drawing from experience, and engaging individuals affected by sickness absence in meaningful dialogue. Accordingly, a mixed-methods approach was employed. Firstly, the scientific

literature was examined using a systematic review and meta-analyses to examine the variables associated with sickness absence in nursing personnel. Then, qualitative efforts were undertaken via focus group sessions with nurses, HCAs, and key informants to further examine sickness absence and gain a deeper understanding of identified predictors. Lastly, this investigation sought to examine if there were variables that might be specific to a northern (northeastern) context.

## 1.3 Background Literature

### 1.3.1 Overview of Sickness Absence in Canadian Nurses and HCAs

Health care employees are 1.5 times more likely to experience a sickness-related absence than any other occupation in Canada (CIHI, 2005).[11] In Ontario, the Workplace Safety and Insurance Board (WSIB) has reported that the rate of job-related sickness absence for health care employees has increased since 2000, while that of other high-risk occupations such as forestry and manufacturing has consistently declined. Certainly, these absences have negative implications for the Canadian economy.[12-13] In Canada, nurses represent the largest group of regulated health professionals.[14] Nursing is considered to be a stressful occupation with physical and psychosocial stresses inherent in its practice.[15-17] Furthermore, researchers have classified nursing as prone to job strain, a circumstance proposed by Karasek (1979)[18] that occurs when an employee's work is highly demanding while offering little decision latitude.[19] In nursing, there is often low autonomy, and it is evidenced through, for example, nurses being scheduled to work for long hours with rotating schedules, serving the needs of many patients, and adhering to orders.[18] Researchers have also determined that employees who have similar duties as nurses, such as HCAs, were also found to experience similar stressors and injury risks.[19]

Given their demanding work, it is not surprising to find staffing shortages and high turnover rates among nurses.[21-25] In fact, it is projected that by the year 2022, the Canadian health care system will have a shortage of approximately the equivalence of 60,000 full-time nursing positions.[25] Studies by O'Brien-Pallace and colleagues (2010, 2001) confirmed the phenomenon of nurse shortages in Canada,[26-27] a situation that is expected to continue as a result of several factors including supply and demand.[27] The authors noted that the nurse-to-population ratio decreased from 825 per 100,000 in 1992, to 752 per 100,000 in 1998.[27] Although the ratio increased marginally in 2004 (759 per 100,000), nurses remain in the unenviable position of having to work overtime and working shifts[27]; factors that contribute to a stressful work environment.[28-32] Staffing shortages can lead to greater work demands, longer work hours, and higher rates of sickness absence.[32]

According to the Canadian Labour and Business Centre, more than 13,000 nurses suffered sickness absence in 2002, which was 80% higher than the Canadian average.[33] From 1999 to 2009, there have been inconsistencies in the annual average number of sick days among nurses, suggesting there have been no real improvement in their overall health and safety in the workplace.[33] In 1999, the average sickness absence-related absence was 13 days annually, which increased to 14.6 days in 2009 and was as high as 16.5 days. In 2010, sickness absences were estimated to have caused the absence of 19,200 nurses across Canada per week.[34] In 2012, full-time nurses continued to have the highest sickness absence related absenteeism rates among all other health care providers and occupations across Canada with an annual cost of about $734.3 million. It has been suggested that a 50% reduction in absenteeism would result in a cost saving of one-half

billion dollars for the health care system.[35] The health care system must replace the equivalent of 11,400 full-time nursing jobs per year due to elevated rates of absenteeism.[36]

### 1.3.2 Understanding Sickness Absence in Nurses and HCAs

Although meta-analytic research and predictive instruments regarding sickness absence are absent in the occupational health and safety literature, there are a number of studies that have examined the risk factors related to sickness absence, including among nurses. Indeed, demographic, physical, psychosocial, and organizational factors have been studied as possible correlates to sickness absence and sickness absence. With this in mind, some limitations and gaps are worthy of mention when examining the literature for predictors of sickness absence among nursing personnel.

First, conflicting findings with some factors were noted when examining the literature. Unsurprisingly, these inconsistencies would likely fail to inform researchers and policymakers seeking to consult the literature on sickness absence. The observable differences in findings between studies imply that sickness absence is still misunderstood. This is in part due to limited qualitative efforts that queried this issue in conjunction with the common use of cross-sectional studies in the quantitative literature. Recognizing that it may be difficult to apply experimental methods for ethical reasons or apply cohort studies for the duration and financial reasons, using cross-sectional studies remains a limitation that requires consideration. Finally, upon examining the literature, an understanding of the magnitude of sickness absence on nursing staff working in northern areas is lacking.

For demographic factors, age was one of the common variables examined.

Conflicting findings have been found for the determinants of sickness absence among nurses and PSWs. Elstad and Vabø (2008) found that PSWs who were over the age of 50 were less likely to experience sickness absence.[37] In contrast, Eriksen, Bruusgaard, and Knardahl (2004) revealed that this specific age group had significantly higher odds of experiencing sickness absence than younger age groups.[38] Using numerical estimates and statistical methods such as meta-analysis could assist with estimating the relative contribution empirically driven predictors of sickness absence.

History of sickness absence was shown to be promising in terms of predicting future sickness absence.[28] For instance, de Castro (2010) found that missing work due to previous injury complaints were significant predictors.[28] The author also revealed other occupational factors that were associated with sickness absence, which are discussed in the latter section of this review of literature.

A cohort study of 4,931 Norwegian HCAs examined occupational factors related to sickness over a three-month period.[38] The outcome of interest was the rate of sickness absence, which was defined as being absent from work due to sickness absence for more than three days. Using logistic regression, the authors found that a lack of encouragement and supportive environments were the strongest predictors of certified sickness absence. Other predictors, more modest in magnitude, included having worked in psychiatric and pediatric units, having previous neck injuries, and experiencing other health problems. While the identified risk factors were helpful in understanding the risk of sickness absence, the actual cause of the sickness absence was not identified.[38] Still, Shamian (2003)[31] stated that a large proportion of sickness absences in nurses were attributable to some form of musculoskeletal pain, which is one the most cited precursors

to sickness absence among nurses.[40-53]

Musculoskeletal injury is defined as damage or self-reported pain of the body's muscular or skeletal system, which may include muscles, tendons, bones, joints, or ligaments.[49] These injuries are becoming a worldwide concern, with great financial costs resulting from compensation and treatment.[50] In a cohort study, lost-time claims from WSIB among various sectors were examined. Researchers found that health care employees, specifically nurses and HCAs, had the highest percentage of lost-time claims (18.9%) due to musculoskeletal pain, particularly neck pain. Earlier work by Hignett (1996) confirmed that nursing personnel were workers at greatest risk of experiencing musculoskeletal pain, especially low back pain injuries, usually resulting from patient handling.[51] More recent literature and reports have shown similar findings.[52-53] For example, The Association of Workers' Compensation Boards of Canada concluded that musculoskeletal injury is one of the most prevalent complaints among Canadian nurses.[53]

Researchers have suggested that musculoskeletal injuries are the consequences of physically demanding nursing and PSW duties.[40] When caring for patients, workers may be required to assist in lifting, which may result in frequent bends and twists. One study examined the accident process leading to overexertion back injuries in nursing staff.[46] The authors concluded that nurses and HCAs were found to be at particular risk of musculoskeletal injury during patient transfers, as they require rapid and unexpected movements in awkward postures.[46]

In addition to actual physical demands placed on nurses and HCAs, it appears the perception of work demand is also associated with the development of musculoskeletal injury. Trinkoff et al. (2003)[39] examined the relationship between nurses' perception of

work demands and their reports of neck, shoulder, and back pain using a 12-item survey (n= 1163). The survey included questions about force, non-neutral postures, and heavy lifting. They identified that nurses with moderate and high perceptions of physical demands in their work were at a higher risk of reporting neck, shoulder, and/or back injuries. Odds ratios for developing such injuries were as high as 9.05 (CI 95%= 3.60 - 22.72) for neck pain, 11.99 (CI 95%= 4.41-32.65) for shoulder pain, and 9.39 (CI 95%= 3.88 – 22.71)[39] for back pain.

Consistent with Trinkoff's (2003)[39] findings, Alexopolous et al. (2003)[47] found that one's perception played a role in predicting sickness absence in nurses. However, in their study, the perception of overall health predicted sickness absence as opposed to the perception of high physical demands. The authors used a cross-sectional design to examine the associations between physical and interpersonal characteristics, and endpoints of musculoskeletal complaints of the lower back, neck, and shoulders among nurses (n= 351) in six Greek hospitals. Nurses were asked to complete a survey, which examined three main outcomes: (1) self-reported musculoskeletal pain in the past 12 months, (2) chronic pain for at least three months, and (3) complaints that led to absence from the workplace.[47] Correlates used in their study included physical workload, psychosocial workload, need for recovery, and perceptions of their own health. Using logistic regression analyses, the researchers discovered that while physical workload had an impact on musculoskeletal pain, the perception of one's health had the strongest association with lost time due to back, neck, and shoulder pain.[47] Additionally, nurses aged 40 years and over were found to be at greater risk of missing work due to any form of musculoskeletal complaint. The authors did not identify any psychosocial predictors

that were significantly correlated with pain reports or lost time.[47]

The literature offers conflicting findings about the relationship between psychosocial variables and their relationship to sickness absence among nurses and HCAs. Alexopolous et al. (2003)[47] were unable to identify any significant correlations. Another cross-sectional study investigated the relationship between burnout and work absence among 259 nursing personnel in major hospitals.[54] Researchers obtained absenteeism rates from hospitals where nurses were employed. Furthermore, burnout was measured for each nurse using the Burnout Scale, which is a psychometrically valid scale for this construct.[54] Multivariate analyses revealed no significant relationship between burnout scores and absenteeism. It is important to note that this study did not discriminate between voluntary and involuntary absences. While no significant associations were found between psychosocial variables and absenteeism, age and burnout were positively correlated. The authors determined that burnout is more likely to occur with increasing age, especially after the age of 45.[54]

Other studies have suggested that psychosocial factors, including mental health and stress, might play a role in the occurrence of sickness absence.[27-28,31] In the context of sickness absence due to psychosocial factors, researchers described missing work as a coping strategy.[19] Psychosocial factors may include mental health (e.g., depression), stress, and burnout.[56-57] Burnout is described as fatigue resulting from extreme demand in combination with feelings of failure, lack of appreciation, and poor support.[58] Burnout's intensity may slowly increase, which may initially present as experiencing low satisfaction and negative attitude in the workplace then eventually, to more intense situations. These may include feelings such as desperateness, depression, and failure to

handle stressors.[58]

Lavoie-Tremblay et al. (2005) piloted a study to seek improvement of the psychosocial work environment in a group of health care workers, comprised mainly of nurses and HCAs employed in a long-term health care unit.[55] They implemented a participatory organizational intervention, which included a commitment from the organization, identification of work constraints, advancement of the action plans, execution of the action plans, and finally evaluation of the action plans and follow-up. Psychosocial measures were taken prior to and after the completion of the intervention. Results revealed that the psychosocial work climate improved significantly and there was a significant reduction in sickness-related absences.[55]

Although the results of this study appeared promising, the study was limited by a small sample size (n= 60) and its status as a "pilot study."[55] Still, the researchers observed a significant decrease in the level of social support offered by supervisors, which raises the question of how improvement can occur in such circumstances. Other variables not measured or statistical confounds may have driven the improved psychosocial work environment and reductions in lost time.[55]

A Canadian study also examined psychosocial factors in addition to occupational and physical factors related to nurses' health by measuring sickness absence.[31] The authors used qualitative methodologies that focused on musculoskeletal pain, stress, and cause of absenteeism. They gathered data from ten Ontario acute care hospitals, where five hospitals had high sickness absence claim rates and five had low claim rates in one quartile. A total of 12 focus group sessions were conducted, consisting of approximately six nurses from the high claim rate hospitals and six from the low claim rate hospitals for

a total of 121 nurses. Prior to the focus group sessions, which discussed health outcome status of nurses, they were asked to complete a rating scale to assess 19 injury prevention interventions.[31]

Both high and low-claim rate hospital nurses stated that workload, physical work environment, and staffing concerns were the top reasons for the high musculoskeletal injury rates.[31] High claim rate hospital nurses identified that workload, psychosocial and mental health, and social support were the contributors to high stress levels among nurses. Low claim rate hospital nurses confirmed the issues with workload but stated that patient issues, and respect issues, which was described as lack of appreciation among nurses, were the causes for high stress levels. Both hospital groups agreed that the leading cause of sickness absence were psychosocial and mental health factors.[39] Other factors included physical health, benefits, and scheduling. The authors of this study also conducted interviews with supervisors and occupational health and safety specialists who confirmed the nurses' disclosures but prioritized their issues differently. For example, occupational health and safety personnel ranked "education" as the top priority for injury reduction, while nurses of both low and high claim rate hospitals and supervisors ranked "physical work environment."[31]

When asked how to prevent musculoskeletal injuries, high stress levels, and high sickness absence rates, participants from both hospital groups identified social support, higher staffing levels, and better scheduling.[31] The findings seemed to underline the importance of positive psychosocial and mental health factors relating to sickness absence in nurses. Staffing levels and scheduling algorithms are also relevant. Given the general shortage of nurses in Canada and worldwide, which leads to longer and more

irregular hours, high rates of sickness absence should not be surprising.[39]

While the authors of the study provided some insight on sickness absence among Canadian nurses[35] and how to prevent them, it did not offer insight on geographical differences (e.g., northern vs. southern Ontario). Thus, it is still unknown how sickness absence manifests, which has adverse implications for the staff and the broader health care system due to the staggering financial costs associated with sick days and disability claims.[11]

Nonconforming shift work and extended hours were subject to frequent investigations in research on nurses and various other workers.[59-70] Recognizing that inconsistent and long hours result in disruptions in the worker's circadian rhythm and lead to omission and commission errors, it may likely lead to injurious risks leading to sickness absence or fatigue. Muecke (2005) presented a review of the literature highlighting 10 years of research examining the effects of rotation night shifts in nurses.[70] There was a general consensus among the studies examined pertaining to the adverse physical and psychosocial effects of rotating shift work in nurses versus non-rotating shift work. One of the main results revealed from the literature review is that nursing personnel over the age of 40 were at greater risk of sickness absence.[70] Thus, the concept of shift work could be a mediating factor that could explain why some studies found age as predictive of sickness absence, and others did not. However, due to some of the study designs presented in those studies (i.e., cross-sectional), no clear conclusion can be made. The researcher also noted that fatigue could also affect patient care.[70]

Whether physical or mental, nurses and HCAs were shown to experience a great deal of fatigue in their work.[71-77] Interestingly, a frequent complaint among nurses is

experiencing fatigue as a result of long work hours, which can lead to symptoms of burnout.[30,76-77] A cross-sectional study of 655 Filipino nurses examined the effects of irregular day, night and evening shifts, as well as mandatory overtime on sickness absence. The authors found that non-day shifts and the occurrence of mandatory shift work were positively associated with sickness absence.[28]

A cohort study conducted by Roelen et al. (2014), examined the effects of both physical and mental fatigue of Norwegian nurses (N= 2059).[72] Physical fatigue was described as distress and weakness, while mental fatigue was described as poor concentration along with limited motivation. The study examined participant nursing staff in various settings including hospitals, psychiatric facilities, and nursing homes. The researchers measured fatigue at baseline and measured illness-related absence after one year. They discovered that physical fatigue was a cogent predictor of sickness absence, but mental fatigue was not. This finding adds uncertainty to the debate about the extent to which psychosocial variables are associated with sickness absence.[72]. An additional interesting finding revealed in this study was the impact of previous sickness absence on future absence, which was previously discussed. Using regression analysis, the authors discovered that previous sickness absence in the past year could predict 25% of future sickness absence and up to 30% of sickness absence in the past two years.[72]

To summarize, the nursing profession is a demanding profession that comes with high rates of sickness absence due to demographic, occupational, physical, and psychosocial. While several studies highlighted some variables as predictive of sickness absence, other studies did not find a statistical relationship. To this end a synthesis of the literature with careful consideration of statistical measures is warranted. Furthermore,

while several factors were described in the literature about their association with sickness absence, it remains vastly misunderstood how or why they might lead to such outcomes. Finally, with little research about nursing staff and sickness absence in northeastern Ontario, efforts from this study could add more knowledge to this geographical area. Applying an evidence-based approach where external evidence, clinical expertise, the insight of the population affected by sickness absence exists, while also considering local evidence (i.e., northern), is required. An effort of this type may also hold the promise of directing resources and interventions in a more focused and informed manner.

### 1.4 Research Questions

This investigation explores the following questions:

1. What are the predictors/factors associated with sickness absence among nurses and HCAs according to the present literature?
2. What factors do nurses, HCAs, and key informants (i.e., experts in nursing field, disability management professionals, and rehab specialists) perceive as factors related to sickness absence and what are their impact?
3. Are there predictors or factors associated with sickness absence for nurses and HCAs that may be specifically associated with working in northeastern Ontario?

A systematic review of the existing literature pertaining to nursing sickness absence was undertaken initially. Studies that have examined the factors related to sickness absence for nursing were investigated. Sample sizes across studies were then pooled based on the predictor then the overall effect was calculated using meta-analytic methods. Concurrently, a qualitative approach was undertaken using independent focus groups that

included nurses (registered nurses and registered nurse practitioners), HCAs, and key informants.

## 1.5 Definition of Key Concepts

In this study, two key concepts: "sickness absence," and "nurses" are defined in detail.

### 1.5.1 Sickness Absence

Sickness absence was operationalized as absence from work that is attributed to sickness by the employee and approved by the employer.[78] Such absences could range in severity and duration. They could also refer to occupational injuries that result in missing work past the accident date, lost wages, and/or those who suffered permanent disability.[79]

### 1.5.2 Nurses

In the first phase of the study, the term "nurse" was broadly defined as any health care worker who undertakes nursing duties.[17,34] This choice was made for four reasons. First, researchers have often combined occupations similar to nursing in their analyses (e.g., nursing assistants, nurse aides) and thus, it was difficult to extract nurses from participant samples. Second, nursing titles and duties vary from country-to-country and therefore, it would be challenging to differentiate between the different titles presented. Third, including occupations with overlapping roles to nurses would be of benefit for the meta-analysis, as it would increase the sample size, and as a result, increase statistical power.[10] Finally, capturing nursing positions with overlapping roles would produce a more comprehensive list of variables that could predict sickness absence in nurses and HCAs, which would provide a greater understanding of risk factors found within the broader profession.

During the second phase of the study, nurses who consisted of registered nurses (RNs) and registered practical nurses (RPNs) along with HCAs took part in independent focus groups. RNs and RPNs work both independently as well as with other health care providers.[79-80] They are essential members of the health care team, as they deliver direct services to patients and support patients in their self-care decisions related to health and illness at all junctures of a patients convalescence. HCAs are employees who assist nurses, hospital staff, and physicians in the basic care of patients. They work in hospitals, nursing homes, and other health care facilities.[80]

The only nursing position omitted from this undertaking was nurse practitioners (NPs). NPs are specialized nurses who represent a very small percentage of the nursing population.[81] Their scope of practice is markedly different from that of other nursing staff, as they require additional education, training, and assume greater liability.[82] Specifically, they frequently diagnose and prescribe medication. Hence, their inclusion might influence or compromise the results of the meta-analyses. In addition, it was found that the role of NPs was fairly new in some areas globally and thus, its scope is not clearly defined.[83]

### 1.6 Rationale for Northeastern Ontario and the City of Greater Sudbury

As previously noted, research on sickness absence either had conflicting findings or could not explain how the factors of interest led to sickness absence. Additionally, research on sickness absence in the nursing population working in northern Ontario is markedly scarce. Thus, this could pose some threats to nurses and HCAs working in such regions. For example, 4.5% of Ontario's population reside in northeastern Ontario yet, it accounts for 40% of its total land area.[6] The vastness of northeastern Ontario is often

seen as a concern in terms of accessibility to health services. To this end, it is suspected that nurses working in the north, even in urbanized regions, could be faced with additional challenges and demands. The City of Greater Sudbury, which will be referred to, as Sudbury hereinafter, was the city selected to learn from their employees about factors associated with sickness absence. Sudbury is located in the northeastern region of Ontario and is the largest urban city in the Northeast Local Health Integration Network.[6] It is classified as an urban city because its population is over 100,000 with large urban centres.[84] In Sudbury, health care is currently one of its largest employment sectors, which accounts for 15% of the entire workforce with approximately 6,000 health care workers.[8] Over 50% of those health care workers are nurses and HCAs. Given their strong representation in the city's workforce, it would be of benefit to gain their insight regarding what are the factors they view as pertinent to sickness absence, and if there are additional demands or unique factors as nursing personnel working in northeastern Ontario.

**1.7 Conceptual Framework**

As previously stated, implementing an evidence-based approach to determine the factors associated with sickness absence and their causes could lead to proper prevention and intervention strategies for nurses and HCAs. The practice of applying evidence-based approaches has developed over the years. Initially, the term evidence-based practice (EBP) referred to the emphasis of clinical research with minimal application of personal clinical experiences.[85-86] EBP evolved consider both the findings of up-to-date research and clinical experiences.[87] More recently, it further evolved also to include the preference of patients in reaching best practices.[88] Furthermore, the application of EBP is

no longer limited to medical interventions, as it is commonly used in various health fields.

The Evidence-Based Practice in Occupational Health Psychology (EBPOHP) framework was used to guide this study.[89] The EBPOHP framework has been used in the field of occupational health and safety. For instance, Bergh, Hinna, Leka, and Jain (2014),[90] applied the EBPOHP framework in developing a performance risk indicator for psychosocial risk in the oil and gas industry.[90] First, the authors reviewed previous research on work-related stress and best practices employed to manage and deal with psychosocial factors present in the workplace. The authors also sought local evidence within the oil and gas industry through internal risk data information and annual employee surveys. Next, they consulted with health and safety and company-specific experts on the risk indicator.

Similar to other evidence-based models, the main focus of the EBPOHP is the integration of practice and research. Like more recent definitions of other evidence-based models, EBPOHP seeks to find the most compelling evidence in reaching decisions for prevention and intervention purposes in occupational health. The model was designed to help to reach decisions based on four sources: (1) investigation of external sources which are commonly derived from scientific literature; (2) local evidence; (3) practitioner expertise; and (4) perspective of those who might be affected by the decision (Figure 1).[89-90]

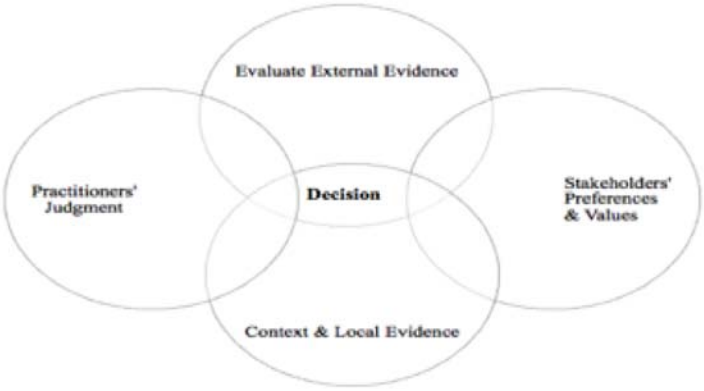


**Figure 1.** Conceptual Framework: Evidence-Based Practice in Occupational Health Psychology

Investigating external sources was achieved through a comprehensive and rigorous systematic review and meta-analysis. Specifically, it helped address the issue of conflicting findings between studies by applying statistical methods to reach an overall effect. Meta-analytic designs are highly regarded when seeking evidence of good quality.[86] However, understanding that many of the study designs included were cross-sectional, it is important to note that this is not a limitation of this undertaking. Instead, it is due to the nature of this type of research, where experimental designs are not appropriate and cohort studies are resource intensive. Nevertheless, the EBPOHP model allows for three other sources of evidence in conjunction with seeking external evidence in order to strengthen decision-making. The latter three sources, which are local evidence, practitioner expertise, and perspective of those who might be affected by the decision, were obtained from the second phase of this undertaking, specifically, the qualitative section.

With interest in learning about sickness absence in northeastern Ontario, nurses, HCAs, and key informants were recruited from Sudbury. Specific questions were used to

understand if there were factors unique or perhaps, of greater risk in northeastern Ontario. As such, focus group sessions with workers from the City of Greater Sudbury were the methods used to seek local evidence for northeastern Ontario. It should be noted however, that we operationalized "local evidence" differently from the framework. For instance, Bergh et al.[91] examined local evidence through collected information by way of internal risk data and employee surveys of specific local organizations. Despite the dissimilarities in definitions, geographical factors were one of the objectives and thus, we propose that this definition is valid for the purpose of this investigation. Notably, this model has not been used extensively in the field to determine how other researchers might interpret the four sources of evidence.

As per the EBPOHP's third source of evidence, key informants served as the practitioners in this undertaking, as they are professionals who work with and support nursing staff. Paradoxically, nurses and HCAs are not viewed as the "practitioners" in this study. Instead they are the individuals who are affected by decisions around sickness absence, which is the EBPOHP's fourth source in seeking evidence in decision-making. This was completed by way of three different focus group sessions with registered nurses, registered practical nurses, and HCAs. In sum, this framework would allow for this investigation to seek and harmonize evidence; using mixed-methods and at the same time seek previous research while also conducting prospective research to address the objectives of this investigation.

A number of conceptual frameworks were considered to guide this study. Compared to other health fields, the application of evidence-based methods in occupational health and safety is still relatively a new concept. For instances, researchers described notable

gaps in the field with respect to seeking external evidence by way of systematic reviews and meta-analysis.[91,92] Unsurprisingly, many of the conceptual frameworks were not deemed as appropriate to guide this study. For instance, one Canadian study utilized an evidence-based approach to support health care workers in British Columbia with an emphasis on collaborative problem-solving. In doing so, the researchers completed a province-wide needs assessment, examined the literature, and conducted focus group sessions with various stakeholders and local practitioners. Despite the similarities in initiatives and populations to this present project, it was difficult to adopt the efforts of the aforementioned study for two primary reasons. First, this study relied on multiple partnerships across an entire province for several years to complete the needs assessment, which was not feasible for this undertaking. Second, the authors did not propose a specific conceptual framework in their study. Instead, they described how they carried out their research and how they reached evidence-based approaches. Therefore, the EBPOHP was deemed as the most appropriate conceptual framework to help guide this study.

## 1.8 Methods

### 1.8.1 Overview

This study utilized a mixed methods approach. The first phase employed meta-analysis to examine the current literature from 1990 to 2016 and identify predictors related to sickness absence in nurses and HCAs. In the second phase, independent focus group sessions were held with two groups of nurses (RNs and RPNs), HCAs, and key informants, which consisted of occupational health and safety specialists, union representatives, and private rehabilitation specialists from Sudbury. The focus groups

were used to identify predictors of sickness absence as well as gain a deeper understanding of how and why such predictors contribute to sickness absence among nursing staff.

For this study, sickness absence was the outcome of interest. It should be noted that sickness absence was first described in this study as "lost time injury, illness, and disability" or "IID." However, after careful considerations supported by the literature, the term sickness absence was deemed more appropriate. This should be noted as several documents, such as consent forms, ads etc., which are also used in Appendices E through H, use the initial term. Notably, the change of terms did not impact the actual definition of the study or its methods.

### 1.8.2 Phase I: Quantitative

The first phase of this study examined variables associated with sickness absence on nursing staff through a systematic review and a meta-analysis, which is discussed in two of this dissertation's chapters. The first chapter focused on demographic, lifestyle, and physical health-related factors and the second focused on mental health, organizational, and work-related psychosocial factors. While the two papers focused on different factors, data were retrieved from one comprehensive systematic review. The rationale is that a broader search could help detect more studies through direct research findings and also through a "snowball" approach (i.e., examining the references of relevant studies).

As this study includes a systematic review of observational studies, the study was registered with the National Institute for Health Research's International Prospective Register of Systematic Reviews (PROSPERO; CRD42017071040).[93] A comprehensive

protocol within the PROSPERO guidelines was used to carry out this section of the study (Appendix A).

The meta-analysis was conducted using five main steps. These steps are discussed in more detail in the second and third chapter of this dissertation. The first step was the search strategy, which describes matters regarding words used for searches as well as the databases used to find pertinent articles. In the second step, articles were screened using eligibility criteria using a screening tool adopted from the Cochrane Handbook Guide for Systematic Reviews[94] (Appendix B). This step ensured that the studies included were of observational design that explored sickness absence among nurses and HCAs with sufficient statistical information such as Odds Ratios (ORs) and Confidence Intervals (CIs) regarding the variables provided.

The third step of the meta-analysis focused on the quality of the selected studies. When considering article inclusion for meta-analysis, it is crucial to include those that are of high quality and assessed in a standardized manner given that deeming an article as 'high quality' can be a subjective enterprise.[95] When examining the literature for a suitable quality checklist, it was difficult to find one that met the criteria for the studies of interest. This is because the studies included in this undertaking were neither intervention-based nor randomized studies.[95-96] Nevertheless, the most appropriate checklists for observational studies found in the literature were the National Health's Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIHQA; Appendix C)[97] and the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE; Appendix D).[98]

The fourth step focused on the coding procedures of the meta-analysis. This step helped organize each selected study by entering pertinent details. The following information was entered into a Microsoft Excel spreadsheet[99]: 1) identification code; 2) year of publication; 3) first author; 4) country origin; 5) study design; 6) sample information; 7) independent variable(s) along with types of measurement tools (e.g., psychological assessments); 8) dependent variable(s) and duration of sickness absence; 8) type of analysis used and presented effect sizes; 9) conclusion; and 10) any potential conflict of interest, such as competing interest or financial gains. For the meta-analysis papers, adjusted odds ratios (ORs) and their corresponding confidence intervals (CIs) were pooled. The process in which studies were included or excluded for both papers were depicted using the Preferred Reporting of Systematic Reviews and Meta-Analysis (PRISMA) Flow Diagram is used to depict the selection of studies.[100]

The final stage was the statistical computation of the meta-analysis. Odds Ratios (ORs) were pooled for at least three studies that reported statistical data on a factor to sickness absence. Extracted data were imported to Comprehensive Meta-Analysis version 3.0 software (CMA 3.0, 2016)[101] and were computed by applying a random-effects model. The probability level ($p$) of equal or less than 0.05 were used as the criterion of significance. However, considering the possibility Type I error due to multiple testing, 0.01 criterion of significance was also considered. Results that were only statistically significant at the 0.05 level are discussed in their respective chapter. Also, heterogeneity testing was computed ($Q$ & $I^2$).[101]

### 1.8.3 Phase II: Qualitative

A qualitative approach was used to gain an in-depth understanding of the factors

associated with sickness absence among nurses and HCAs. Views obtained from key informants were also solicited, with the intention of receiving a more comprehensive understanding regarding such factors. To this end, experts in the nursing profession (i.e., union representatives), disability managers, and rehab specialists took place in focus group sessions.[102-104]

For nurse and PSW recruitment, ads for participation were placed in the local hospital and a long-term care setting in Sudbury (Appendix E). To encourage rich and meaningful discussions, participants required a minimum of five years of work experience in their respective role to be eligible for study inclusion. Upon recruitment, participants were grouped based on their job title (RN, RPN, and PSW) to ensure homogeneity in terms of education and job levels. Specifically, facilitating sessions with similar job roles and education could help discuss common issues found in the particular job role, which would allow for better snowballing of experiences and concerns as opposed to a mixed group.

Key informants were selected based on discussions held with the researchers involved in this undertaking. Subsequently, invitation letters were sent to each key informant, highlighting the purpose and implications of this study (Appendix F). A total of five key informants were included in a focus group discussion. They consisted of one hospital safety specialist, one hospital disability management representative, one RN union representative for northeastern Ontario, one RPN and PSW union representative for northeastern Ontario, and one private rehabilitation specialist.

A total of 20 participants took part of the focus group sessions (RN n= 6, RPN n= 4, PSW n= 5, Key Informants n= 5). Most participants were females (n= 18) and 60%

were from a hospital setting (n= 12). A table with occupational characteristics of the participants is provided (Chapter 4, Table 1). All focus group sessions took place at Laurentian University's Centre for Research in Occupational Health and Safety conference room.

***Procedure***

Written informed consent forms were signed prior to focus group discussions (Appendix G). A semi-structured interviewing guide was used to generate discussion (Appendix H). There were two primary open-ended questions asked at each focus group. The first question focused on identifying factors that could predict sickness absence for their respective population (i.e., RN, RPN, PSW). Key informants were asked to comment on both nurses and HCAs. The second question sought to identify any risk factors that could potentially be "northern" specific, and thereby, nursing staff members from the Sudbury area were selected. For both questions, the facilitator asked follow-up questions to accurately understand their answers, gain more information and examples where applicable.

***Data Analysis***

All focus group discussions were digitally audio-recorded and transcribed verbatim by a research assistant assigned to complete this specific task (JD). Each participant was given a code to ensure anonymity. Subsequently, as a quality assurance method, the moderator (BG) reviewed the transcript of each focus group session while listening to the recordings. Thematic analysis was used to analyze the narrative data using the qualitative analysis software NVivo version 11.[105]

## References


1. Robson LS, Clarke JA, Cullen K, Bielecky A, Severin C, Bigelow PL, et al. The effectiveness of occupational health and safety management system interventions: a systematic review. *Safety Sci.* 2007;45(2):329-53.

2. Tullar JM, Brewer S, Amick BC, et al. Occupational safety and health interventions to reduce musculoskeletal symptoms in the health care sector. *J Occup Rehabil*. 2010;20(2):199-219. doi:10.1007/s10926-010-9231-y.

3. Waddell G, Burton AK. Occupational health guidelines for the management of low back pain at work: evidence review. *Occupational Med (Lond)*. 2001;51(2):124-135.

4. Darr W, Johns G. Work strain, health, and absenteeism: a meta-analysis. *J Occup Health Psychol*. 2008;13(4):293-318. doi:10.1037/a0012639.

5. Dabboussy M, Uppal S. Work Absences in 2011. Statistics Canada Catalogue no. 75-001-X, *Perspectives on Labour and Income*. Ottawa, ON: Statistics Canada; 2012:1–11.

6. North East Local Health Integrated Network. *Integrated Health Service Plan 2013-2016*. 2013:1–39.

7. Northern Colleges Collaborative Project. *An Environmental and Labour Market Scan of Northern Ontario.* Northern Colleges Collaboration; 2015:1-41.

8. Economic Modeling Specialists Intl. *Occupation Report: Greater Sudbury Census Division 2008-2012*. Ottawa, ON: Statistics Canada; 2013:1-4.

9. Davey MM, Cummings G, Newburn-Cook CV, Lo EA. Predictors of nurse absenteeism in hospitals: a systematic review. *J Nurs Manag.* 2009;17(3):312-330. doi:10.1111/j.1365-2834.2008.00958.x.

10. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. *Introduction to Meta-Analysis*. Chichester, UK: John Wiley & Sons; 2008. doi: 10.1002/9780470743386. refs

11. Canadian Institute for Health Information. *Canada's Health Care Providers*. 2005 Chartbook. Ottawa, ON: 2005:1–7212.

12. Martin, S. The staggering cost of illness and injury. *CMAJ*. 2003;168(3):332-332a.

13. Gilks J, Logan R. *Occupational Injuries and Diseases in Canada, 1996-2008: Injury Rates and Cost to the Economy*. Ontario: Human Resources and Skills Development Canada; 2010.

14. Statistics Canada. Table 282-0030. Labour force survey estimates (LFS), average days lost for personal reasons per full-time employee by National Occupational Classification for Statistics (NOC-S), sex and age group, annual (days), CANSIM (database).

15. Garrosa E, Rainho C, Moreno-Jiménez B, Monteiro MJ. The relationship between job stressors, hardy personality, coping resources and burnout in a sample of nurses: a correlational study at two time points. *Int J Nurs Stud*. 2010;47(2):205-215. doi:10.1016/j.ijnurstu.2009.05.014.

16. Garrosa E, Moreno-Jiménez B, Liang Y, González JL. The relationship between socio-demographic variables, job stressors, burnout, and hardy personality in nurses: an exploratory study. *Int J Nurs Stud*.2008;45(3):418-427. doi:10.1016/j.ijnurstu.2006.09.003.

17. Canadian Federation of Nurses Unions. *The Nursing Workforce: Canadian Federation of Nurses Backgrounder*. Ottawa, ON; Canadian Federation of Nurses Unions; 2012:1–8.

18. Karasek R, Theorell T. Healthy Work: *Stress, Productivity, and the Reconstruction of Working Life.* New York, New York: Basic Books, 1990.

19. Bourbonnais R, Mondor M. Job strain and sickness absence among nurses in the province of Quebec. *Am J Ind Med.* 2001;39(2):194-202.

20. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence: a three month prospective study of nurses' aides. *Occup Environ Med*. 2003;60(4):271-278. doi:10.1136/oem.60.4.271.

21. Tshitangano TG. Factors that contribute to public sector nurses' turnover in Limpopo province of South Africa. *Afr J Prim Health Care Fam Med*. 2013;5(1). doi:10.4102/phcfm.v5i1.479.

22. Jong-Wook L. Working together for health: world report released by WHO. *J Nurs Manag.* 2010; 13:221-230.

23. Canadian Nurses Association. *Health Human Resources; 2012.* Available from: http://www2.cna-aiic.ca/CNA/issues/hhr/default_e.aspx.

24. Oulton J. The global nursing shortage: an overview of issues and actions. *Policy Politics Nurs Pract*. 2006;7(3):34S–39S.

25. Basu K, Gupta A. Nursing shortages: where and why. *Health Policy Research Bulletin*, 2007;13

26. O'Brien-Pallas L, Murphy GT, Shamian J, Li X, Hayes Li. Impact and determinants of nurse turnover: a Pan-Canadian study. *J Nurs Manag.* 2010;18(8):1073-1086. doi:10.1111/J.1365-2834.2010.01167.X.

27. O'Brien-Pallas LL, Doran DI, Murray M. et al. Evaluation of a client care delivery model, part 1: variability in nursing utilization in community home nursing. *Nurs Econ.* 2001;(6);267-276.

28. de Castro, AB, Fujishiro K, Rue T, Tagalog EA, Samaco Paquiz L, Gee GC. Associations between work schedule characteristics and occupational injury and illness. *Int Nurs Rev.* 2010;57(2):188-194.

29. Rajbhandary S, Basu K. Working conditions of nurses and absenteeism: Is there a relationship? An empirical analysis using National Survey of the Work and Health of Nurses. *Health Policy*. 2010;97(2):152-159.

30. Greenslade M, Paddock K. *W*orking conditions of nurses: a cause for concern. *Health Policy Research Bulletin*. 2007;13:1-46.

31. Shamian J, O'Brien-Pallas L, Thomson D, Alksnis C, Kerr MS. Nurse absenteeism, stress and workplace injury: What are the contributing factors and what can/should be done about it? *Int J Sociol Soc Policy.* 2003;23(8/9):81-103.

32. Gormanns N, Lasota M, McCracken M, Zitikyte, D. *Quick Facts: Absenteeism and Overtime.* Adapted from: *Trends in Own Illness or Disability-Related Absenteeism and Overtime among Publicly-Employed Registered Nurses — Summary of Key Findings.* Report prepared by Informetrica Ltd. for Canadian Federation of Nurses Unions: Ottawa, ON; 2011.

33. Canadian Nursing Advisory Committee. *Full-Time Equivalents and Financial Costs Associated with Absenteeism, Overtime, and Involuntary Part-time Employment in the Nursing Profession.* Canadian Labour and Business Centre. 2002:1–11

34. Canadian Nursing Advisory Committee. *Our Health, Our Future: Creating Quality Workplaces for Canadian Nurses*. Ottawa, ON: Health Canada; 2002.

35. O'Brien-Pallas L, Tomblin M G., Laschinger H, White S, Wang S, McCulloch C. *Building the Future: An Integrated Strategy for Nursing Human Resources in Canada. Canadian Survey of Nurses from Three Occupational Groups.* The Nursing Sector Study Corporation. Ottawa, ON; 2005.

36. Berry L, Curry P. *Nursing Workload and Patient Care*. Ottawa, ON: Canadian Federation of Nurses Union; 2012.

37. Elstad JI, Vabø M. Job stress, sickness absence and sickness presenteeism in Nordic elderly care. *Scand J Soc Med.* 2008;36(5):467-474. doi:10.1177/1403494808089557

38. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of intense or disabling low back pain; a prospective study of nurses' aides. *Occup Med.* 2004;61(5):398-404. doi:10.1136/oem.2003.008482.

39. Trinkoff AM, Lipscomb JA, Geiger-Brown J, Storr CL, Brady BA. Perceived physical demands and reported musculoskeletal problems in registered nurses. *Am J Prev Med.* 2003;24(3):270-275. doi:10.1016/S0749-3797(02)00639-6.

40. Pompeii LA, Lipscomb HJ, Dement JM. Predictors of lost time from work among nursing personnel who sought treatment for back pain. *Work.* 2010;37(3):285-295. doi:10.3233/WOR-2010-1080.

41. Smedley J, Egger P, Cooper C, Coggon D. Prospective cohort study of predictors of incident low back pain in nurses. *BMJ*. 1997;314(7089):1225.

42. Côté P, Kristman V, Vidmar M, et al. The prevalence and incidence of work absenteeism involving neck pain. *J Manipulative Physiol Ther*. 2009;32(S):S219–S226. doi:10.1016/j.jmpt.2008.11.022.

43. Kant I, de Jong L, van Rijssen-Moll M, Borm P. A survey of static and dynamic work postures of operating room staff. *Int Arch Occup Environ Health.* 1992;63:423-8.

44. Trinkoff AM, Lipscomb JA, Geiger-Brown J, Brady B. Musculoskeletal problems of the neck, shoulder, and back and functional consequences in nurses. *Am J Ind Med*. 2002;41:170-8.

45. Trinkoff A, Storr C, Lipscomb JA. Physically demanding work and inadequate sleep, pain medication use, and absenteeism in registered nurses. *J Occup Environ Med.* 2001;43:355-63.

46. Engkvist IL, Hjelm EW, Hagberg M, Menckel M, Ekenvall L, Risk indicators for reported over-exertion back injuries among female nursing personnel. *Epidemiology* 2000;11(5): 519-522.

47. Alexopoulos EC, Burdorf A, Kalokerinou A. Risk factors for musculoskeletal disorders among nursing personnel in Greek hospitals. *Int Arch Occup Environ Health.* 2003;76(4):289-294. doi:10.1007/s00420-003-0442-9.

48. Burdorf A, Jansen JP. Predicting the long term course of low back pain and its consequences for sickness absence and associated work disability. *Occup Med.* 2006;63(8):522-529. doi:10.1136/oem.2005.019745.

49. Hootman JM, Macera CA, Ainsworth BE, Addy CL, Martin M, Blair SN. Epidemiology of musculoskeletal injuries among sedentary and physically active adults. *Med Sci Sports Exerc.* 2002;34(5):838-84.

50. Andersson GBJ. Epidemiologic features of chronic low back pain. *Lancet*. 1999;354:581-585.

51. Hignett S. Work-related back pain in nurses. *J Adv Nurs.* 1996;23(6):1238-1246.

52. Yassi A, Lockhart K. Work-relatedness of low back pain in nursing personnel: a systematic review. *Int J Occup Environ Health*. 2013;19(3):223-244. doi:10.1179/2049396713Y.0000000027.

53. Association of Workers' Compensation Boards of Canada. National work injury statistics. Retrieved from: http://www.awcbc.org/common/assets/nwisptables/all_tables.pdf

54. Lavoie-Tremblay M, Bourbonnais R, Viens C, Vézina M, Durand PJ, Rochette L. Improving the psychosocial work environment. *J Adv Nurs.* 2005;49(6):655-664.

55. Cameron SJ, Horsburgh ME, Armstrong-Stassen M. Job satisfaction, propensity to leave and burnout in RNs and RNAs: a multivariate perspective. *Can J Nurs Adm.* 1994;7(3):43-64.

56. Kedem, Y, Bagan Y. Burnout and absenteeism among nurses in health care management. *J Health Care Mark.* 2005;5(1):93-112.

57. Laschinger HKS, Grau AL. The influence of personal dispositional factors and organizational resources on workplace violence, burnout, and health outcomes in new graduate nurses: a cross-sectional study. *Int J Nurs Stud.* 2012;49:282-291.

58. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol.* 2001;52(1):397-422. doi:10.1146/annurev.psych.52.1.397.

59. Wong IS, McLeod CB, Demers PA. Shift work trends and risk of work injury among Canadian workers. *Scand J Work Environ Health*. 2010;37(1):54-61. doi:10.5271/sjweh.3124.

60. Berger AM, Hobbs BB. Impact of shift work on the health and safety of nurses and patients. *Clin J Oncol Nurs*. 2006;10(4); 465-471

61. Dembe AE, Erickson JB, Delbos RG, Banks SM. Nonstandard shift schedules and the risk of job-related injuries. *Scand J Work Environ Health*. 2006;32(3):232-240. doi:10.5271/sjweh.1004.

62. Dembe AE. The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States. *Occup Environ Med*. 2005;62(9):588-597. doi:10.1136/oem.2004.016667.

63. Folkard S, Tucker P. Shift work, safety and productivity. *Occup Med.* 2003;53(2):95-101.

64. Gold DR, Rogocz S, Bock N, et al. Rotating shift work, sleep, and accidents related to sleepiness in hospital nurses. *Am J Public Health.* 1992;82:1011-14.

65. Horwitz IB, McCall BP. The impact of shift work on the risk and severity of injuries for hospital employees: an analysis using Oregon workers' compensation data. *Occup Med (Lond).* 2004;54:556-63.

66. Lipscomb, J.A., Trinkoff, A.M., Geiger-Brown, J. & Brady, B. (2002) Work-schedule characteristics and reported musculoskeletal disorders of registered nurses. *Scand J Work Environ Health.* 28, 394-401.

67. Lockley, S.W., et al. (2007) Effects of health care provider work hours and sleep deprivation on safety and performance. *Joint Commission Journal on Quality and Patient Safety.* 33, 7-18.

68. Smith L, Folkard S, Poole CJM. Increased injuries on night shift. *Lancet.* 1994;344:1137-1911.

69. Williams C. Work-life balance of shift workers. Perspectives 2008;5-16. Shields M. Shift work and health. *Health Rep*. 2002;9:11-33.

70. Muecke S. Effects of rotating night shifts: literature review. *J Adv Nurs.* 2005;50(4):433-439.

71. Roelen CAM, Koopmans PC, Schreuder JAH, Anema JR, van der Beek AJ. The history of registered sickness absence predicts future sickness absence. *Occup Med*. 2011;61(2):96-101. doi:10.1093/occmed/kqq181

72. Roelen C, van Rhenen W, Schaufeli W, et al. Mental and physical health-related functioning mediates between psychological job demands and sickness absence among nurses. *J Adv Nurs.* 2014;70(8):1780-1792. doi:10.1111 /jan.12335.

73. Shen, Barbera, J, Shapiro CM. Distinguishing sleepiness and fatigue: focus on definition and measurement. *Sleep Med Rev.*2006;10:63-76.doi:10. 1016/j.smrv.2005.05.004

74. Pasupathy KS, Barker, LM. Impact of fatigue on performance in registered nurses: Data mining and implications for practice. *J. Healthc. Qual*. 2010;34:22-30. doi: 10.1111/ j.1945-1474.2011.00157.x

75. Roelen CAM, Bültmann U, Groothoff J, et al. Physical and mental fatigue as predictors of sickness absence among Norwegian nurses. *Res Nurs Health*. 2013:453-465. doi:10.1002/nur.21558.

76. Occupational Health Clinics for Ontario Workers. Shift work, health effects and solutions. 2005. Retrieved from:

http://www.ohcow.on.ca/resources/handbooks/shiftwork/shiftwork.pdf

77. Canadian Nurses Association. *Nurse Fatigue and Patient Safety. Research Report.* Ottawa, ON: CNA; 2010.

78. Whitaker SC. The management of sickness absence. *Occup Environ Med*. 2001;58(6):420-424.

79. Canadian Institute for Health Information *Regulated Nurses: Canadian Trends, 2006 to 2010.* Canadian Institute for Health Information; 2011.

80. Statistics Canada. National Occupational Classification - Statistics (NOC-S) 2006.

81. Canadian Nurses Association. *2010 Workforce Profile of Nurse Practitioners in Canada*. 2012:1-15.

82. College of Nurses of Ontario. *Practice Standard: Nurse Practitioner*. Toronto, ON: College of Nurses of Ontario; 2018:1-16.

83. Carryer J, Gardner G, Dunn S, Gardner A. The core role of the nurse practitioner: practice, professionalism and clinical leadership. *J Clin Nurs.* 2007;16(10):1818-1825. doi:10.1111/j.1365-2702.2007.01823.x.

84. Ministry of Energy and Infrastructure. *Proposed Growth Plan for Northern Ontario*. Government of Ontario. 2009; Toronto, ON.

85. Guyatt G, Cairns J, Churchill D. Evidence-Based Medicine Working Group. Evidence based medicine: a new aproach to teaching the practice of medicine. *JAMA.*1992*;*268:2420-2425.

86. Mantzoukas S. A review of evidence-based practice, nursing research and reflection: leveling the hierarchy. *J Clin Nurs.* 2007:214-223.

87. Sackett DL, Rosenberg WMC & Gray JA. Evidence based medicine: what it is and what it isn't. *BMJ.* 1996;312:71-72.

88. MacPhee M & Pratt P. Evidence based practice. *J Pediatr Nurs.* 2005;20:396-398.

89. Briner RB. Developing evidence-based occupational health psychology. In: Houdmont IJ, Leka AS & Sinclair RR. *Contemporary Occupational Health Psychology*. Chichester, UK: John Wiley & Sons;2012:35-36. http://doi.org/10.1002/9781119942849.ch3

90. Bergh, L. I. V., Hinna, S., Leka, S., Jain, A. Developing a performance indicator for psychosocial risk in the oil and gas industry. *Safety Sci.* 2014:62(C), 98-106. http://doi.org/10.1016/j.ssci.2013.08.005

91. Carter T. The application of the methods of evidence-based practice to occupational health. *Occup Med*. 2000;50(4):231-236.

92. Verbeek J, Husman K, van Dijk F, Jauhiainen M, Pasternack I, Vainio H. Building an evidence base for occupational health interventions. *Scand J Work Environ Health*, 2004;30(2):164-170.

93. Gohar B, Larivière M., Lightfoot, N, Larivière C, Wenghofer, E. An examination of the factors associated with sickness absence in nurses and nurses' aides. PROSPERO: International prospective register of systematic reviews. 2017. CRD42017071040

94. Higgins JT, Green S. (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1 [updated March 2011]. The Cochrane Collaboration, 2011. Retrieved From: http://www.cochrane.org

95. Sanderson S, Tatt ID, Higgins JP. Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: a systematic review and annotated bibliography. *Int J Epidemiol.* 2007;36(3):666-676. doi:10.1093/ije/dym018.

96. Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health.* 1998;52(6):377-384.

97. National Health Institute. National Health's Quality Assessment Tools for Observational Cohort and Cross-sectional Studies. Retrieved from:

https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

98. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ.* 2007;335(7624):806-8. doi:10.1136/bmj.39335.541782.AD

99. *Excel 2011.* Microsoft Office for Mac.

100. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med.* 2009;6(7):1-6

101. Borenstein M, Hedges L, Higgins J, Rothstein H. *Comprehensive Meta-Analysis Version 3.* Engelwood, NJ: Biostat; 2016.

102. Krueger RA, Casey MA. *Focus Groups: A Practical Guide for Applied Research.* 5th ed. 2015; London, United Kingdom: Sage Publications.

103. Catterall C, Maclaran P. Focus group data and qualitative analysis programs: coding the moving picture as well as the snapshots. *Sociol Res Online* 1997;2(1).

104. Rabiee F. Focus-group interview and data analysis. *Proc Nutr Soc*. 2007;63(04):655-660. doi:10.1079/PNS2004399.

105. *NVivo* qualitative data analysis software. Version 11.QSR International Pty Ltd.; 2017.

# CHAPTER 2:

## A Meta-Analysis of Demographic, Lifestyle, and Physical Health Factors as Possible Predictors of Sickness Absence Among Nursing Staff

Basem GOHAR,[1] Michel LARIVIÈRE,[2] Nancy LIGHTFOOT,[3] Elizabeth WENGHOFER,[4] Céline LARIVIÈRE,[5] Behdin NOWROUZI-KIA.[6]

1 PhD Program in Interdisciplinary Rural and Northern Health, Laurentian University, Sudbury, ON, Canada.

2 School of Human Kinetics, Northern Ontario School of Medicine, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

3 School of Rural and Northern Health, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

4 School of Rural and Northern Health, Laurentian University, Sudbury, ON, Canada.

5 School of Human Kinetics, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

6 School of Rural and Northern Health, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada

Corresponding author: Basem Gohar, 935 Ramsey Lake Road. Laurentian University,

Sudbury, ON, Canada

**ABSTRACT:**

**Background**: The nursing profession is a stressful occupation with physical and psychosocial stressors that are considered inherent in its practice. Thus, it is not surprising that there are higher sickness absences in this occupation compared to many others. **Objective:** This paper sought to examine and measure the association between demographic, lifestyle, and physical health factors, and sickness absence. **Methods:** A meta-analysis was undertaken to quantify the association between theoretically driven predictive variables and sickness absence. Keyword searches were conducted on five online databases: CINAHL, ProQuest Allied, ProQuest database theses, PsychINFO, and PubMed, as well as references of identified studies. Further screening and quality testing were conducted to determine study eligibility. Pooled odds ratios (OR) and their corresponding confidence intervals for analysis. Heterogeneity testing including the degree of variability between studies were computed using Cochrane $Q$ and $I^2$, respectively. **Results:** The initial search identified 812 studies of which 17 met eligibility and had sufficient statistical data on one or more of the identified variables. Sex was found to be a significant demographic predictor of sickness absence, with female nurses or HCAs (OR= 1.73; CI 95%= 1.33 – 2.25) having higher odds than males. No lifestyle factors (i.e., physical activity and difficulty sleeping) were predictive of sickness absence. All physical health factors were predictive of sickness absence including (1) those who rated their health as poor, (OR= 1.38; CI 95%= 1.19 - 1.60); (2) those with history of sick leaves (OR= 3.35 CI 95%= 2.37 – 8.19); and (3) those who experience musculoskeletal pain (OR= 2.41; CI 95%= 1.77 – 3.27). Furthermore, among those with musculoskeletal pain, the odds of sickness absence were higher in those experiencing back and lower back

pain (OR= 3.05; CI 95%= 1.66 – 5.62). Except for poor health rating (Q= 29.02, $p<.05$; $I^2$= 82.77%) heterogeneity was generally low for most subtests of the meta-analysis. **Conclusion:** There are a number of specific factors that increase the likelihood of sickness absence among nursing personnel with physical health factors all being statistically significant. These factors should be considered closely by employers and policy makers to offer a preventative approach to sickness absence. Future research should seek replication of this current effort while also examining other salient determinants of health-related absenteeism through quantitative and qualitative methodologies.

## 2.1 Introduction

Due to the physical and psychosocial stressors inherent in the nursing practice, this profession is considered to be a stressful occupation.[1,2] At the same time, there has been an increase in professional demands.[3] Consequently, issues such as job turnover, human resource shortages, and especially sickness absence, have also increased.[4-6] Despite the improvement of employees' overall health and safety in recent years.[7] sickness absence remains problematic in the health care sector, especially among nursing staff. For instance, when examining the Canadian workforce, research on absenteeism among full-time employees has revealed that nursing staff have the highest rates of sickness absence.[7] Specifically, nurses and nursing assistants who are commonly known as health care aides (HCAs), displayed the highest incident rates of illness and disability (10.6% and 10.8%), as well as the longest average of days lost per year (13.7 and 14.7).[7]

Conflicting findings have been found regarding the determinants of sickness absence among nurses and HCAs. Elstad and Vabø (2008) found that HCA's who were over the age of 50 were less likely to experience sickness absence.[8] In contrast, Eriksen, Bruusgaard, and Knardahl (2004) revealed that this specific age group had significantly higher odds of experiencing sickness absence than younger age groups.[9] Such contradictory findings were also noted with other predictive factors such as physical activity. For instance, some studies determined that nursing staff that exercise had lower odds of sickness absence, while other studies found no significant relationship between the variables. These differences could be attributed to several factors such as differences in job roles or cultural origin. Nevertheless, such contradiction offers limited assistance to researchers, practitioners, and policy makers, who consult the literature for supportive

evidence. Quantitatively amalgamating pertinent literature could offer clarity among the conflicting findings between studies as to what is classified as a significant risk factor for sickness absence.[10] More specifically, using statistical methods such as meta-analysis can help determine the relative contribution of putative determinants of sickness absence. In doing so, more studies can be considered simultaneously, which improves statistical power and the generalizability of findings.

To our knowledge, only one meta-analysis has examined the predictors of sickness absence.[11] However, while some of the pooled data included those from nurses and HCAs, the researchers included vastly different, non-health related occupations as well. Thus, their findings may not accurately capture results for the nursing profession due to methodological issues including heterogeneity and the weight of other studies pooled in the analysis.

In one systematic review, Davey and colleagues (2009) examined absenteeism among hospital nurses.[12] Although the researchers offered insight on factors related to the population of interest, there were no statistical computations that estimated overall effects. Thus, quantifying the relationship and thereby, the magnitude, between sickness absence and a variable of interest is unknown. Secondly, the authors only included research that examined non-health related absences. Lastly, the authors only included hospital-based nurses, so other areas where nursing staff might work were not examined.

The current study examined the determinants of sickness absence and HCAs. Specifically, this study focused on epidemiological studies that investigated demographic, lifestyle, and physical factors. It is important to note that the subsequent chapter of this

thesis (Chapter 3) examined other variables, such as mental health, organizational and work-specific psychosocial constructs, by way of a meta-analysis.

## 2.2 Methods

### 2.2.1 Registration of Review and Protocol

As this is a systematic review of observational studies, this study was registered with the National Institute for Health Research's International Prospective Register of Systematic Reviews (PROSPERO; CRD42017071040).[13] Furthermore, a comprehensive protocol adapted from PROSPERO was used, which identifies the: 1) authors' information and affiliation, 2) objective of the review, 3) search strategy, 4) date and language restrictions as well as inclusion/exclusion criteria, 5) quality testing procedures, 6) data extraction, and 7) data synthesis and statistical analysis.[13]

### 2.2.2 Search Strategy

The following search strategy was used to explore the predictors of sickness absence in nursing and HCAs. The following databases were used: CINAHL, ProQuest Allied, ProQuest database theses, PsychINFO, and PubMed. Databases were selected based on relevance to the nursing and health care population, physical and mental health, and also graduate-level dissertations in efforts to reduce publication bias. Keyword searches were entered into the databases for this review (Appendix A). During the database search, the command "OR" was used with keywords: 'predict*', 'risk factor(s)', and 'risk*'. These possibilities were combined with (i.e., "AND" command) a list of possible keywords (i.e., "OR" command): 'lost-time', 'time loss', 'sick time', 'sick* absen*', 'injur*', 'ill*', 'disab*', and 'sick*'. The two sets of key words were then

meshed with (i.e., "AND" command) the word, 'nurs*'. A snowball strategy was also used such that the references of the studies cited in the identified papers were examined.

### 2.2.3 Inclusion and Exclusion Criteria

Titles and abstracts were reviewed for each article that was retrieved from the searches. A checklist was constructed for article selection. This checklist included information to help select appropriate articles for the analysis. Information used in the checklist included study design, population of interest (i.e., nursing staff), identified factors related to sickness absence, appropriate statistical analyses etc. All eligible studies were English-language prospective studies that examined the sickness-related absenteeism of nursing personnel from January 1990 until December 2016. Dissertations and unpublished papers were considered for inclusion based on their level of quality, which is discussed further in the next section. Articles on absenteeism related to injury, physical or mental illnesses were included. Studies that examined absenteeism with no regard to sickness absence (e.g., voluntary absence) were excluded.

Studies had to be observational (i.e., case-control, cohort, or cross-sectional), as there is limited to no research that was experimental in nature to investigate sickness absence and specific variables for ethical reasons. Given the population of interest for this study, the sample was limited to "nursing staff." For the purpose of this study, the term "nursing staff" was broadly defined as any health care worker who undertakes nursing duties.[14] This choice was based on four reasons. Firstly, researchers have often combined occupations similar to nursing in their analyses (e.g., nursing assistants, nurse aides, personal support workers), thus it is difficult to extract nurses from participant samples. Secondly, nursing titles and duties vary from country-to-country, and therefore,

it would be challenging to differentiate between the diverse titles presented. Thirdly, including occupations with overlapping roles to nurses would be of benefit for the meta-analysis as it will increase sample size and, as a result, increase statistical power.[10] Lastly, capturing nursing positions with overlapping roles would produce a more comprehensive list of variables that could predict sickness absence in nurses and HCAs, which would provide a greater understanding of risk factors for the profession as a whole. All job titles of nurses and aides were included in this study except nurse practitioners (NPs). NPs are specialized nurses who form a very small percentage of the nursing population.[15] Their scope of practice is characteristically different from that of other nursing staff.[16] Specifically, they commonly work in primary care roles instead of or with physicians, as they can diagnose and prescribe medication. Thus, their inclusion might influence or compromise the results of this present study. Also, the role of an NP was found to be relatively new in some areas and thus, its scope is not clearly defined globally.[17] Articles that included other occupations in conjunction with nursing staff (e.g., physicians) were excluded unless the sample sizes and effect sizes of sickness absence were presented independently by occupation type. Despite their exclusion, references of studies that examined sickness absence of nursing staff with other occupational groups were considered in order to minimize selection bias.

Sickness absence was the dependent variable and operationalized as an absence from work attributable to sickness by the employee and that had been approved by the employer.[18] Studies that reported data on voluntary absences including maternity leaves or other reasons that were not due to sickness absence were excluded. Upon examination of the literature, some studies categorized sickness absence duration as short-term and

long-term. However, the definitions of either short-term or long-term varied considerably between studies. Furthermore, other studies investigated sickness absence as a continuous measure within a timeframe (e.g., 12 months). Given the lack of consistency between studies, longer durations were selected if studies reported more than one time frame. The rationale is that longer duration is potentially less influenced by those factors that lead to short-term sickness absence.

Predictors (independent variables) of sickness absence had to be stated clearly in studies. Lastly, studies had to present sufficient statistical data such as effect sizes along with the associated standard error for inclusion. If effect sizes were not presented, the author of the paper was contacted for that information. If statistical information was deemed insufficient to calculate effect sizes and authors could not be reached, the study was excluded.

### 2.2.4 Quality Testing and Data Extraction

The quality of eligible articles was independently assessed by two reviewers using the National Institutes of Health's Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIH, 2016).[19] The tool consisted of 14 'yes' or 'no' questions completed by two raters independently (BG and BN). The tool helped the researchers to deem the quality of each observational study by examining several elements including: research objective, population of interest, sampling method, sample size, and response rates, dependent and independent variables, analysis methods, and extraneous variables that could have impacted the results of the study. The inter-rater reliability score was determined by calculating the percentage of consistency between the two raters, which yielded an 83% agreement. Any inconsistencies between the reviewers were discussed in

detail until a final decision was reached. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE, 2007)[20] was also used as part of quality testing. Unlike the former tool, the STROBE requires the author to write in detail information regarding the study's introduction, methods, results, discussion, and other information such as funding and conflict of interest. This tool was found to be helpful to the researchers, as it requires the inclusion of information regarding each study's external validity (i.e. generalizability).

The following information was entered into a Microsoft Excel spreadsheet: 1) identification code; 2) year of publication; 3) first author; 4) country origin; 5) study design; 6) sample information; 7) independent variable(s) along with types of measurement tools (e.g., psychological assessments); 8) dependent variable(s) and duration of sickness absence; 9) type of analysis used and presented effect sizes; 10) conclusion; and 11) any potential conflict of interest such as competing interest or financial gains.

For this study, adjusted odds ratios (ORs) and their corresponding confidence intervals (CIs) were pooled. Studies that reported findings as rate ratios were treated as ORs.[11] Studies that reported findings as risk ratios or relative risks (RR) were also treated as ORs, unless the specific predictor was a "common" effect, attributing more than 10% of the sample and had significant effect size that was either below 0.5 or above 2.5.[21] Such effect sizes were not pooled in analyses, as there is a risk of over or underestimating the effect if treated as ORs.[21] Results from studies that were derived from correlational studies were not combined in the pooled sample, as they did not provide sufficient statistical data for predictive purposes. Borenstein et al., (2009)

indicated that it is not ideal to pool observational studies reporting ORs and correlations together, as they would be substantially different.[10]

### 2.2.5 Statistical Analysis

ORs were pooled for three or more studies that reported statistical data on a predictive factor to sickness absence. However, some studies reported several predictors and thus, data were pooled accordingly. Extracted data were imported to Comprehensive Meta-analysis version 3.0 software (CMA 3.0, 2016)[22] and were computed by applying a random-effects model. Unlike its counterpart, the fixed-effect model, the random-effects analysis assumes that the true effect size differs from one study to the other.[23,24] This is important for the purpose of this study, as not all participants shared the same characteristics (e.g., education, responsibilities etc.), so data were not obtained or measured similarly, and thus, employing a random-effects model is the appropriate method in this instance. Accordingly, the studies included in the analysis represent a random sample of effect sizes that could have been observed. Moreover, when computing a random-effects model, its summary effect is the mean estimate of the presented effects. Alpha level was set at .05 with corresponding Confidence Intervals (CI) at 95%.

Follow-up statistical computations were conducted to detect for heterogeneity including the variation in study outcomes between studies for each variable.[25] Specifically, Cochrane *Q* was used to examine heterogeneity with alpha level set at 0.05. Furthermore, the ratio of true heterogeneity to total observed variation was examined using $I^2$ percentages. $I^2$ percentages up to 25% were considered low. Percentages higher than 25 but lower than 75 were considered moderate, while percentages of 75 were

considered as high.[25-27] Together, Cochrane $Q$ and $I^2$, help offer a better understanding about heterogeneity. This is because while Cochrane $Q$ is sensitive to the number of studies pooled in the analysis, $I^2$ is not. On the hand, $I^2$ acknowledges the level of variation between studies, while Cochrane $Q$ simply serves as a test of significance.

## 2.3 Results

### 2.3.1 Study Characteristics

A table applying Preferred Reporting of Systematic Reviews and Meta-Analysis (PRISMA) Flow Diagram is used to depict the selection of studies (Figure 1).[28] The initial search yielded 1,323 studies. After removing duplicates, 812 studies were remaining, which were then screened for eligibility by examining titles and abstracts. Eligible references obtained from a snowball effect yielded 158 studies. A total of 53 epidemiological studies of predictive factors of sickness absence among nurses and HCAs were found to be relevant. Of those articles, 36 were omitted. Of those 36 articles, 24 did not have sufficient statistical data relevant for prediction purposes. Furthermore, two articles were excluded following quality testing. Finally, ten studies had all necessary data but were excluded, as they fell outside this study's focus. However, they are incorporated in the subsequent chapter of this thesis. In total, 17 studies included data on demographic, lifestyle, and physical health (N= 17).

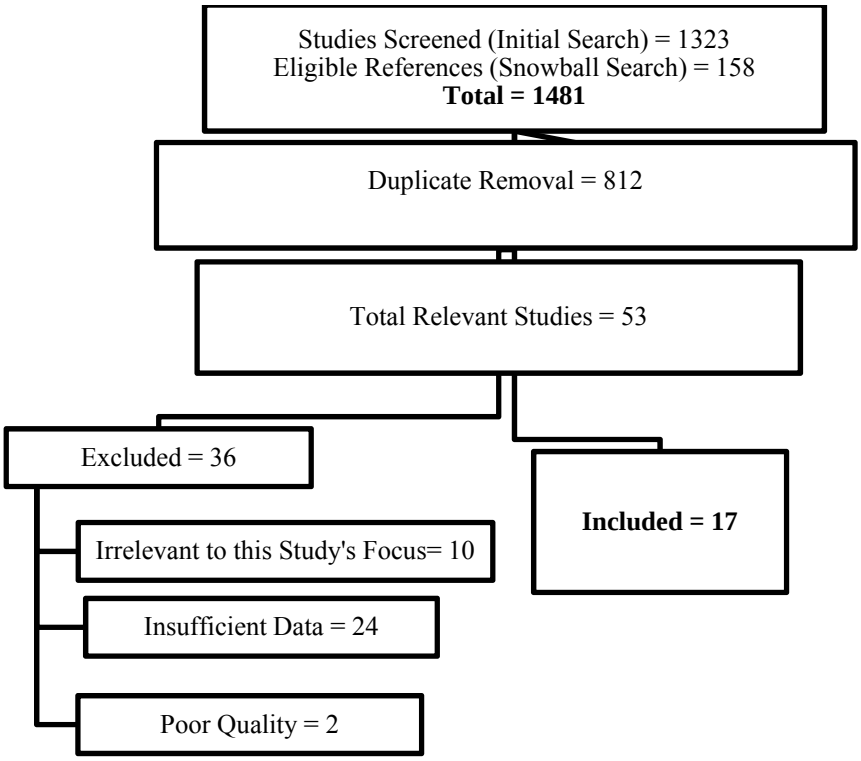


**Figure 1**. PRISMA Flow Diagram of Studies Included and Excluded for Chapter 2[28]

Of the 17 studies, 12 were cohort (71%), while five were of a cross-sectional design. Over 80% of the studies were based out of Europe, 79% of which originated from Nordic countries. Other European studies included Greece, Netherlands, Spain, and the United Kingdom, specifically England (21%). Two studies from the United States of America and one Brazilian-based study was also included. All participants in the studies were either nurses or HCAs (including titles such as health care workers and elderly care workers). The studies were carried out in a wide range of health care settings, including hospitals, community-based settings, and outpatient settings. Sufficient statistical data were obtained for various variables that pertained to demographic information (i.e., age and sex), lifestyle information (i.e., sleep and physical activity), and general and physical health information (i.e., perceived general health, history of sick leave, and musculoskeletal pain). Please see Table 1.

| First Author, year | Study Design | Origin | Profession | Setting | Predictor(s) | Measure(s) |
|---|---|---|---|---|---|---|
| Alexopolous, 2011[29] | Cross-sectional | Greece | Nurses | Hospital | Age, Perceived Health | Survey |
| Smedley, 1997[30] | Cohort | England | Nurses | Hospital | Age, Musculoskeletal Pain | Survey |
| Rauhala, 2006[31] | Cohort | Finland | Nurses | Hospital, Wards | Age, Sex | Survey |
| Eriksen, 2004(a)[9] | Cohort | Norway | Nurses' Aides | Various settings | Age, Perceived Health, Musculoskeletal Pain | Survey |
| Elstad, 2008[8] | Cross-sectional | Nordic | Nurses' Aides | Various settings | Age | Survey |
| Ferreira, 2012[32] | Cross-sectional | Brazil | Nurses & Nurses' Aides | Hospital | Sex, Physical Activity, Sleep Problems, Perceived Health, Musculoskeletal Pain | Survey |
| Reis, 2003[33] | Cross-sectional | Spain | Nurses & Nurses' Aides | Hospital | Sex | Database |
| Rodriguez-Acosta, 2009[34] | Cohort | USA | Nurses & Nurses' Aides | Hospital | Sex | Survey |
| Eriksen, 2002[35] | Cohort | Norway | Nurses' Aides | Various settings | Physical Activity | Survey |
| Pompeii, 2010[36] | Cohort | USA | Nurses & Nurses' Aides | Hospital/Tertiary Care | Physical Activity, Sleep Problems, Previous Sick Leave | Data |
| Eriksen, 2003[37] | Cohort | Norway | Nurses' Aides | Various settings | Physical Activity, Perceived Health, Musculoskeletal Pain | Survey |
| Nilsson, 2010[38] | Cohort | Sweden | Nurses | Hospital | Sleep Problems, Perceived Health, | Survey |
| Carneiro, 2008[39] | Cross-sectional | Denmark | Nurses' Aides | Elderly Care Settings | Sleep Problems | National Survey |
| Roelen, 2013[3] | Cohort | Norway | Nurses | Hospital, Nursing Homes, & Ambulant Care | Perceived Health | Survey/ SF-12[40] |
| Horneij, 2004*[41] | Cohort | Sweden | Female Nurses' Aides | Home-Care | Musculoskeletal Pain | Survey |
| Eriksen, 2004(b)[42] | Cohort | Norway | Nurses' Aides | Various settings | Musculoskeletal Pain | Survey |
| Jensen, 2010[43] | Cohort | Denmark | Female Nurses' Aides | Various settings | Musculoskeletal Pain | Survey |

**Table 1**. Individual Description of Studies Included in Meta-Analysis (N= 17)
* Study Included Two Separate Samples

### 2.3.2. Predictors of Sickness Absence

#### *Demographic Variables*

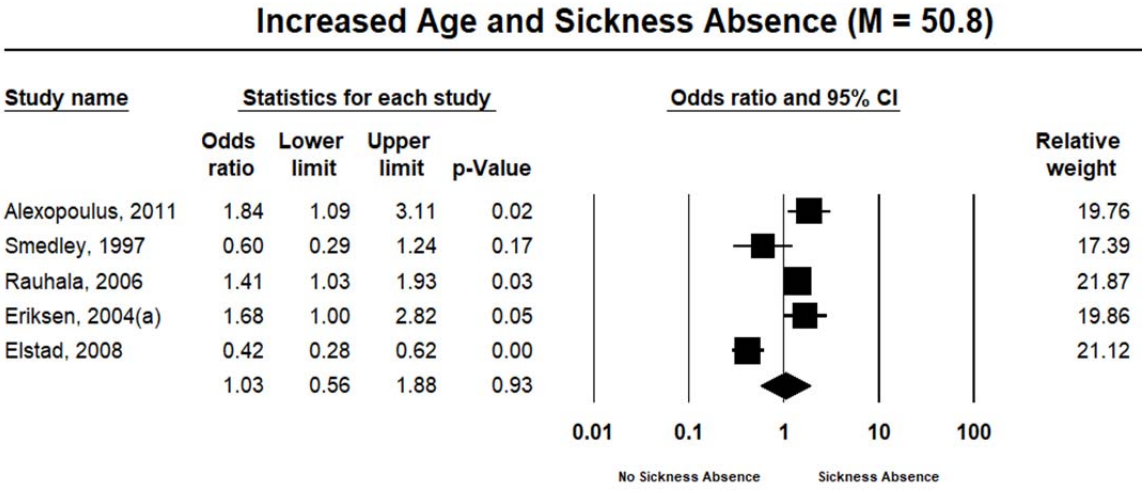


**Table 2. Meta-analysis of Increased Age and Sickness Absence**

Among the 17 identified studies in this paper, eight considered demographic factors (Table 2), and five studies were pooled for an analysis of age. It is important to note that studies grouped age ranges differently. However, the overall trend from most studies is that increased age predicts a higher risk of sickness absence. Most studies used the youngest age groups as points of reference (i.e., OR= 1). Of the five studies, one had 45+ as the oldest range; three had ages 50+ as the oldest range while one study had 59+ as the oldest range. As an estimate, average age was calculated based on the lowest age group in each of the five studies, which was 50.8 years. Interestingly, being 51+ years of age or older was not a significant predictor of sickness absence (OR= 1.03; CI 95%= 0.563 – 1.88; $p$= .93).

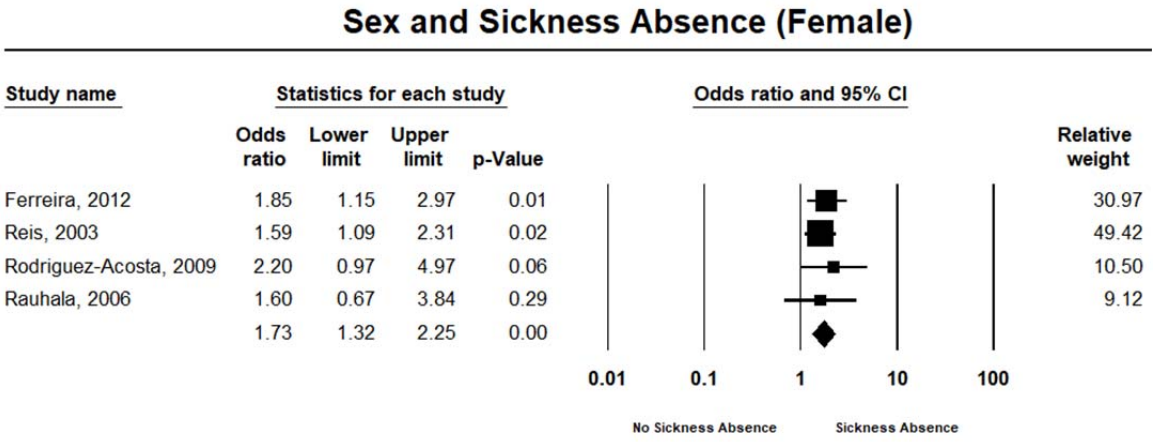


**Table 3. Meta-analysis of Increased Age and Sickness Absence**

In terms of sex, four studies were included in the analysis (Table 3) and it was found that females had a greater likelihood of a sickness absence than male staff (OR= 1.73; CI 95%= 1.33 – 2.25; $p< .05$). All pooled studies shared the same effect direction with female nursing staff having higher odds of sickness absence. However, only two were statistically significant and one neared statistical significance ($p= .058$).

***Lifestyle Variables***

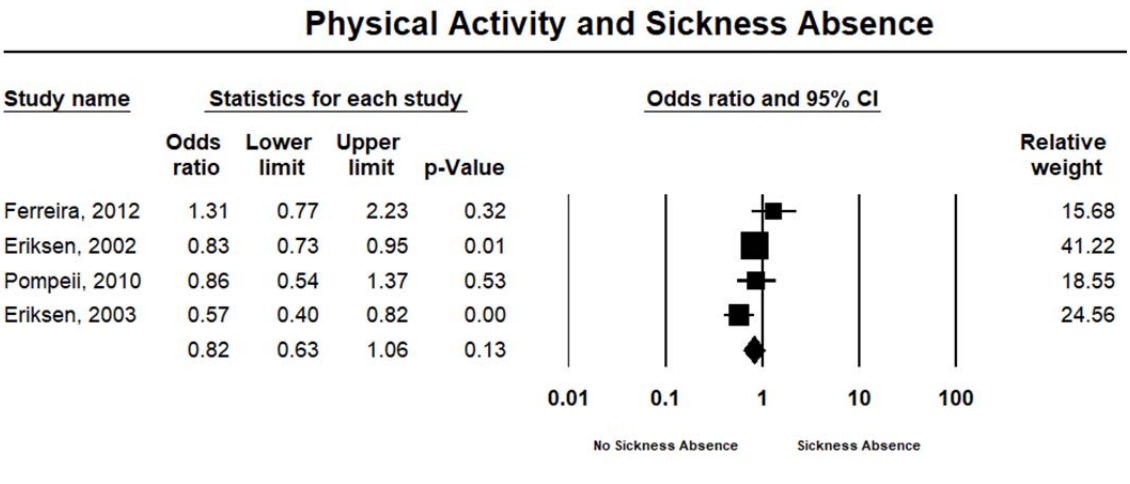


**Table 4. Meta-analysis of Increased Physical Activity and Sickness Absence**

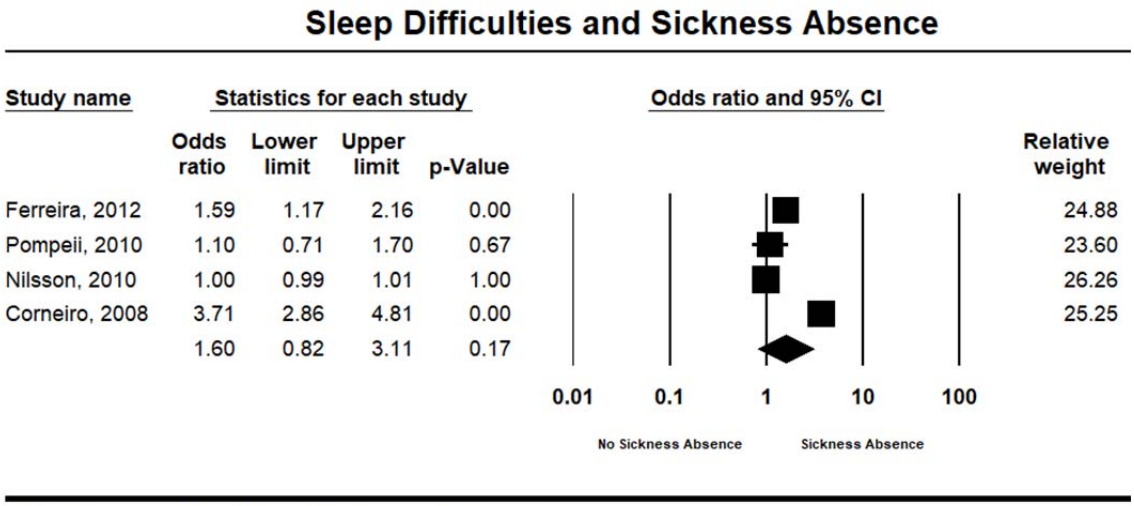


**Table 5. Meta-analysis of Sleep Difficulties and Sickness Absence**

A total of six studies were pooled in the analysis of lifestyle predictors for sickness absence, which included physical activity and sleeping problems. Data were obtained through surveys completed by the participants. Levels of physical activity were examined in four different studies; however, the way in which they examined physical activity varied slightly. Three studies looked at frequency of physical activity per week versus no physical activity.[32,35,36] The fourth study looked at types of physical activity with "no physical activity."[37] Given that all studies deemed no physical activity as the reference group, all studies were kept for analysis (Table 4). Increased physical activity did not significantly reduce the odds of sickness absence (OR= 0.82; CI 95%= 0.63 – 1.06; $p$ = 0.17). Sleep problems, which were described as either insomnia or difficulty sleeping at night, were not found to be significant predictors of sickness absence (OR= 1.60; CI 95%= 0.82 - 3.11; $p$>.05). Only one of the four studies presented fairly high odds of sickness absence (OR= 3.71), while the remaining studies presented modest-to-no association between the two variables (Table 5).

***Physical Health Variables***

A total of 11 studies were included in the examination of physical health factors as predictors of sickness absence. The factors include perceived health, history of sickness absence, and musculoskeletal pain. It should be noted that one study[41] examined and analyzed two samples individually, and thus, a total of 12 samples (n= 12) were pooled for meta-analytic computations. All physical factors presented in the analyses were statistically predictive of sickness absence.

**Perceived Health and Sickness Absence**

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Ferreira, 2012 | 3.41 | 2.47 | 4.71 | 0.00 | 12.13 |
| Alexopoulus, 2011 | 2.90 | 1.35 | 6.22 | 0.01 | 3.26 |
| Roelen, 2013 | 1.08 | 1.04 | 1.12 | 0.00 | 29.35 |
| Eriksen, 2004(a) | 1.39 | 1.00 | 1.93 | 0.05 | 11.91 |
| Eriksen, 2003 | 1.59 | 1.19 | 2.13 | 0.00 | 13.70 |
| Nilsson, 2010 | 1.04 | 1.01 | 1.07 | 0.01 | 29.65 |
| | 1.38 | 1.19 | 1.59 | 0.00 | |

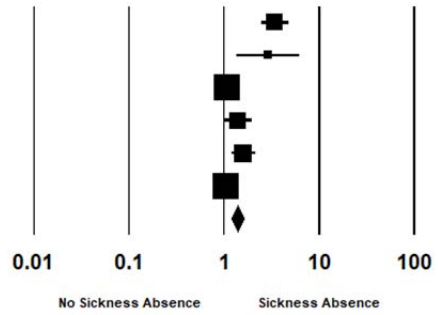


**Table 6. Meta-analysis of Perceived Poor Health and Sickness Absence**

**Previous Sick Leave and Sickness Absence**

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Pompeii, 2010 | 1.80 | 1.18 | 2.75 | 0.01 | 36.34 |
| Horneij, 2004 | 6.40 | 3.97 | 10.31 | 0.00 | 35.56 |
| Horneij, 2004(b) | 3.30 | 1.33 | 8.18 | 0.01 | 28.10 |
| | 3.35 | 1.37 | 8.19 | 0.01 | |


**Table 7. Meta-analysis of Previous Sick Leave and Sickness Absence**

All but one study obtained information on participants' health perceptions.[9,29,32,37,38] The other study[3] used the Short-Form Health Survey (SF-12v2).[40] Results revealed that nurses and HCAs, who rated their health as poor, had a greater likelihood of experiencing sickness absence (OR= 1.38; CI 95%= 1.19 - 1.60; $p< .001$). This finding was found across all six studies pooled into this analysis (Table 6). Although only two studies were examined, one of which had two separate samples, these were pooled to examine how previous sick leave influenced future sickness absence, and results revealed a strong positive association between these variables (Table 7). More specifically, the overall effect suggests that the odds of experiencing sickness absence are 3.35 more likely in the event of previously having a certified sick leave (OR= 3.35; CI 95%= 1.37 – 8.19; $p< .001$).

**Musculoskeletal Pain and Sickness Absence**

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Ferreira, 2012 | 4.77 | 3.28 | 6.93 | 0.00 | 13.92 |
| Smedley, 1997 | 7.30 | 3.50 | 15.21 | 0.00 | 8.71 |
| Eriksen, 2003 | 1.62 | 1.25 | 2.09 | 0.00 | 15.63 |
| Eriksen, 2004(a) | 1.62 | 1.21 | 2.16 | 0.00 | 15.18 |
| Eriksen, 2004(b) | 2.08 | 1.32 | 3.28 | 0.00 | 12.64 |
| Horneij, 2004 | 1.89 | 1.20 | 2.97 | 0.01 | 12.67 |
| Horneij, 2004(b) | 4.45 | 1.26 | 15.68 | 0.02 | 4.40 |
| Jensen, 2010 | 1.81 | 1.56 | 2.11 | 0.00 | 16.85 |
| | 2.41 | 1.77 | 3.26 | 0.00 | |

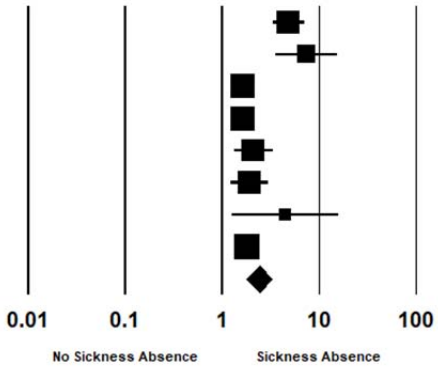


**Table 8. Meta-analysis of Those Who Experienced Musculoskeletal Pain and Sickness Absence**

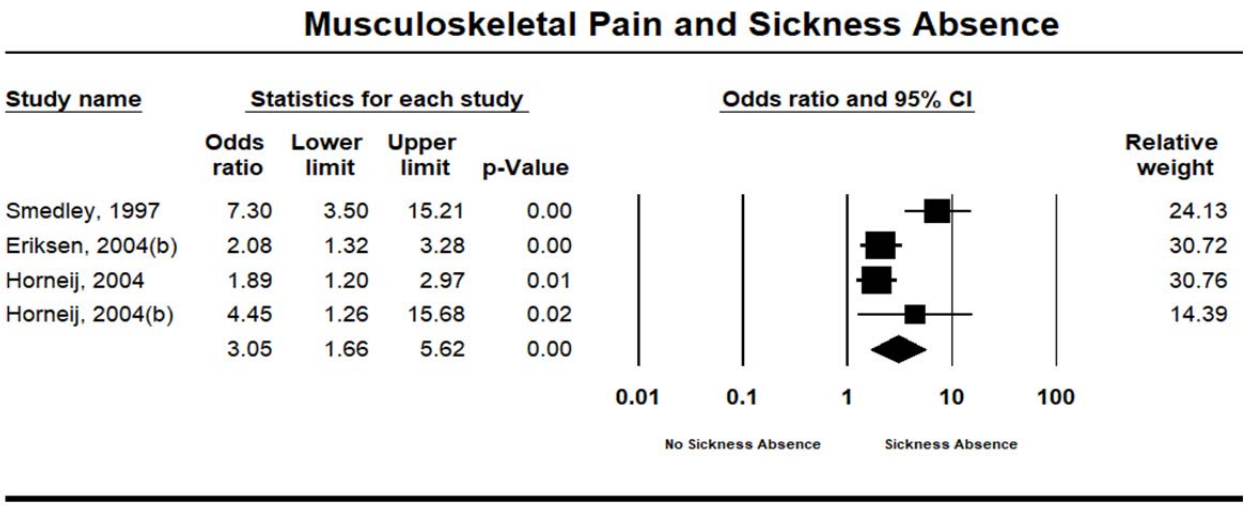


**Table 9. Meta-analysis of Those Who Experienced Musculoskeletal Pain, Specifically Back Pain and Sickness Absence**

Experiencing musculoskeletal pain was examined by pooling seven studies (8 samples). Overall effect results underlined that having musculoskeletal pain increased the likelihood of sickness absence by a factor of 2.41 (CI 95%= 1.77 – 3.27; $p< .001$). All studies in this analysis showed a significant association between these two variables (Table 8). As there was sufficient statistical information to further explore musculoskeletal pain by focusing on back pain, a further analysis was computed. Of the four samples included, three looked specifically at lower back pain and one looked at overall back pain (Table 9). Like experiencing general musculoskeletal pain, experiencing back pain increased the odds of sickness absence (OR= 3.05; CI 95%= 1.66 – 5.62; $p< .001$).

### 2.3.3 Heterogeneity Testing

Of the eight analyses included in this study, only one variable was determined as highly variable under the random-effects model. Specifically, results revealed that the variable examining poor health rating, which was statistically associated with higher sickness absence, was highly heterogeneous ($Q= 29.02$, $p< .01$). Furthermore, the

percentage of the variability between studies due to heterogeneity was also high ($I^2$= 82.77%). Also, experiencing musculoskeletal pain was shown to have moderate levels of variability among studies ($I^2$= 35.03%), however was not statistically heterogeneous as per $Q$ ($Q$= 10.77; $p$= 0.22). The remaining variables were not statistically heterogeneous with low to no variability among studies ($I^2$< 25%). Please see Table 10 for a summary of variables assessed with corresponding effect sizes, confidence intervals, degrees of freedom, Cochrane $Q$, and $I^2$.

| Variable | OR | CI Lower Limit | CI Upper Limit | *P* | *Q* df | *Q* | *p* | $I^2$ |
|---|---|---|---|---|---|---|---|---|
| Age | 1.03 | 0.56 | 1.88 | 0.93 | 4 | 3.77 | 0.44 | 0% |
| Sex (female) | 1.73 | 1.32 | 2.25 | <.01 | 3 | 0.64 | 0.88 | 0% |
| Physical Activity | 0.82 | 0.63 | 1.06 | 0.13 | 3 | 3.8 | 0.72 | 21.48% |
| Sleep | 1.60 | 0.82 | 3.11 | 0.17 | 3 | 2.34 | 0.31 | 0% |
| Poor Health Rating | 1.38 | 1.19 | 1.59 | <.01 | 5 | 29.02 | <.01 | 82.77% |
| Previous Sick Leave | 3.35 | 1.37 | 8.19 | .01 | 2 | 1.39 | 0.50 | 0% |
| Musculoskeletal Pain | 2.41 | 1.77 | 3.26 | <.01 | 8 | 10.77 | 0.22 | 35.03% |
| Back Pain | 3.05 | 1.66 | 5.62 | <.01 | 3 | 3.29 | 0.35 | 8.82% |

**Table 10**. Analysis of Heterogeneity Using Cochrane $Q$ and $I^2$

## 2.4 Discussion

### 2.4.1 Interpretation of Findings

This paper aimed to investigate the demographic, lifestyle, and physical factors that were predictive of sickness absence among nurses and HCAs by way of a meta-analysis. With respect to demographic predictors, older age did not increase the odds of sickness absence. Two correlational studies that were excluded from the analysis also did not find a significant association between age and sickness absence.[44,45]

It is important to note that age groups varied among studies, and thus, readers must interpret the findings cautiously. Still, it appears that age is not a cogent predictor of sickness absence. This finding is in line with prior literature.[46] It may be that the lengthier work experience of older employees results in workers having learned how to

avoid injurious risks, while less experienced employees might not be aware of the risks or have not adapted to the physical and mental workload of the job.[47] For instance, in a cohort study that examined nursing personnel who sought treatment for back pain, the authors found that having less than two years of work experience significantly increased the risk (RR= 3.40; CI 95%= 1.60 – 7.10) of long-term (8+ days) sickness absence compared to those with more work experience.[36] Another possible factor is that newer, younger employees might be delegated more physically demanding work than those with more seniority. On the other hand, there is the inherent increased risk of several chronic conditions with increased age.[48] Older staff might leave the workplace or the profession in its entirety due to a number of other factors. Therefore, the inconsistencies in the scientific literature could be attributed to other spurious factors that move in step with increased age.

Sex was found to be a significant predictor with female nurses having higher odds of sickness absence than their male counterparts. This finding was noted among other health care workers besides nurses and HCAs[49] and applies to other occupational sectors.[50-53] Despite the consistencies between studies, there are no clear reasons for these findings. Some studies have suggested that women might have to fulfill several roles in their day, such as working full time and caring for children. Results from an international study that sought to examine factors related to sickness absence revealed that married women had significantly higher risks of sickness absence than single (never-married) women.[50] Additionally, irrespective of sex, divorced or separated nurses and HCAs had higher odds of sickness absence than those with partners.[32,54]

A second explanation is that sex difference may potentially be a product of the likelihood of reporting sickness absence. Results from a Finnish study revealed that female staff had higher reports of poor physical functioning, diagnosed diseases, physical work demands, and fatigue than male staff.[51] However, the authors stated that this was not because female employees are at higher risk of experiencing such adversarial effects in the workplace. Alternatively, they discovered that women were more likely to report health concerns or the need for sickness absence than men.[51] This is consistent with findings in the mental health field, where it was determined that women were likely to report signs of depression sooner than men, which helps explain treatment effectiveness.[55]

Although physical activity did not significantly reduce the odds of sickness absence, some factors require consideration. As previously noted, half of the pooled studies in this analysis revealed a significant reduction in sickness absence when participants reported frequent physical activity on a regular basis. Furthermore, in a meta-analysis that examined sickness absence in various occupations researchers observed that physical activity reduces the risk of short-term sickness absence.[11]

Physical activity might indirectly play a role in reducing sickness absence. Nilsson (2011) found that increased physical self-care, which included physical activity and leisure time, did not reduce sickness absence, but rather reduced the risk of occupational injuries.[56] Consequently, if injury risks decrease, the likelihood of sickness absence is also likely to decrease. In addition, other factors that are highly related to physical activity, such as obesity, could contribute to high levels of stress, musculoskeletal disorders, and, ultimately, sickness absence.[57,58] Furthermore, the

studies pooled in the analysis measured activity levels through self-reports and therefore, there is the possibility of reporting biases. This bias is especially common when reporting levels of fitness and physical activity, where participants tend to either over report or under-report their levels of fitness.[59]

With respect to this population and its often physically demanding job characteristics, a further bias should be considered when interpreting the results of this analysis. Unless the type of activity was specified (e.g., resistance training, running, etc.) in the respective study, nursing participants could have estimated their level of physical activity in relation to their work. In other words, some participants might be regularly exercising next to working a physically demanding occupation while other participants consider their work as part of their physical activity. To this end, future studies should consider defining "physical activity" and include various levels of fitness based on specific requirements that are independent of their work. Despite the lack of statistical evidence from this study, carefully designed physical activity could help improve work capacity and thereby reduce sickness absenteeism.

Difficulty sleeping did not increase the odds of experiencing sickness absence. However, difficulty sleeping is only one of many issues related to "sleep" (e.g., too much sleep, difficulty staying awake). Moreover, similar to physical activity, "sleep issues" could potentially be one of numerous interrelated elements that might lead to sickness absence. For instance, shift work is an unavoidable part of the nursing profession. Working night shifts was found to increase the likelihood of sickness absence.[37,60,61] Additionally, numbers of shifts, time difference between shifts, self-medicating, and

anxiety were all factors that might contribute to shift work related disorders including sleep disturbances.[62]

Self-rated perceptions of general health were significant predictors of sickness absence. All studies that examined the perception of general health in this analysis indicated that the odds of sickness absence increased as self-rated health decreased. Although this finding might seem simplistic or considered to be a foregone conclusion, it confirms that nurses and HCAs have a fairly accurate rating of their own health. Given the level of heterogeneity of this variable, interpretations should be made with a degree of caution. The detected variability between studies could be due to how health perception was measured or operationalized. Specifically, the way in which the authors collected or defined poor health could be one of the factors that influenced variability, and hence, heterogeneity.[25] Nevertheless, it is a variable worth consideration in the workplace given its simplicity and applicability.

Equally robust in terms of predictive potential is a history of sick leave. The idea of the past predicting the future has found considerable support in other meta-analytic research, including other disciplines, such as corrections.[63] Irrespective of profession, similar trends have also been demonstrated.[64-68] For instance, a European study that sought to examine sickness absence among hospital staff discovered that episodes of sickness absence in the past year predicted approximately 25% of future prolonged sickness absences and 30% within a two-year span.[67] Thus, employers should monitor data on sick leave to better support their staff. By closely monitoring sickness absence spells, a better detection of antecedents of sick leave, or perhaps, appropriate interventions could be implemented in order to reduce the risk of future sick leaves. In

other words, data on sick leave should be used proactively to help prevent future sick leaves, which in turn would foster a healthier workplace.

Perhaps one of the more studied areas in the occupational health field is musculoskeletal pain (due to either personal or organizational factors). Unsurprisingly, it was determined that suffering musculoskeletal disorders or recurrent pain would significantly predict lost time from work. This likelihood increases if the pain is located in the back region (OR= 3.05). Given the number of studies pooled for this particular analysis, it is clear that musculoskeletal pain, and the chronicity of such, is a strong predictor of sickness absence. With musculoskeletal disorders being well-studied in the nursing profession, researchers have been able to isolate further the movements that could lead to further sickness absence among those with previous injuries.[69] For instance, nurses and HCAs who had a history of back pain and who experienced difficulty reaching overhead and bending at the waist were likely to experience time loss that amounted to eight days or longer.[36]

With the increase in ergonomic research and technological advances, there have been improvements in the way nursing personnel undertake their daily duties that were once physically exerting. For instance, experimental studies within the nursing field demonstrated the effectiveness of using lifts during patient handling with promising results in terms of reducing the risk of musculoskeletal pain and sickness absence.[70,71] However, some aspects of the nursing profession are quite unpredictable, especially with patient handling, which might lead nurses and HCAs to suddenly move or lift from awkward positions, which in turn leads to injury risks.[29]

### 2.4.2 Limitations and Future Research

Despite the breadth of these analyses, there are limitations that are worthy of mention. First, from a methodological point of view, publication and search biases are an inherent part of conducting a systematic review. Although all efforts were made to minimize this risk, such as exploring broad searches and investigating unpublished research, there is always a risk of bias. Additionally, while the random-effects model was an appropriate method to carry out this analysis, it is subject to greater error with limited studies pooled into the analysis.[10,24] Specifically, if the number of studies is small, the estimate of the between variance would be lower in accuracy. For this reason, a minimum of three studies was pooled (rather than two) to mitigate the problems that arise from poor precision.

As described in this study, one variable was highly heterogeneous and thus, the variable poor health and its association with sickness absence should be interpreted with caution. Also, a moderate level of variability was detected among studies in the variable musculoskeletal pain. Similar to the former variable (i.e., poor health), such variability could be due to how the independent variable (i.e., musculoskeletal pain) was defined in each study. This could in part explain why the follow-up variable, back pain, also yielded statistically significant odds to increase sickness absence, yet was not statistically heterogeneous. It should be noted however, that the presented heterogeneity analyses pose some potential limitations.

It is understood that when running a number of analyses, the overall chance of a type I error (i.e., false positive) increases. This problem also exists when conducting subgroup analyses for meta-analytic computations. However, there is no clear consensus

on how to resolve this issue in studies applying meta-analyses.[10] One possible remedy to this issue is to use a stricter criterion for statistical significance (e.g., alpha of 0.01). Interestingly, the *p* values of all the statistically significant factors in this study were found at 0.01 or lower. While several considerations were made to lessen methodological biases and statistical errors that might affect the presented results, consulting with nursing staff and occupational health and safety experts about these findings is recommended.

Vis-à-vis study design, all observational studies were considered for this undertaking. This includes cross-sectional research, which represented approximately 29% of the studies pooled for the analysis. As such, causal relationships among the variables cannot be determined in cross-sectional studies.[72] By extension, it is unknown if the identified risk factors were present before and/or after the health outcome of interest, and thus, it poses some limitations on the power of "prediction." However, given that cohort studies are often time and cost intensive, and experimental designs are impractical or unethical when using these variables, cross-sectional studies were included with other observational studies.

Concerning the population of interest, it is understood that the nurses and HCAs pooled for this study work in various settings and each setting poses different demands. It is also understood that nurses and HCAs are not homogeneous and likely assume highly disparate roles in their work. Policies and procedures with respect to duties and responsibilities, in addition to the operationalization of nursing positions are likely to vary considerably between regions and countries, which leads to several researchers to pool nurses and HCAs together. However, it would be beneficial to conduct meta-analytic studies that focused on each profession independently. Furthermore, this study

examined the effect of one independent variable irrespective of other mediating factors that contribute to the dependent variable (i.e., sickness absence). As a final caveat, sickness absence experienced by personnel varies from person to person and those unique factors are likely to mitigate the likelihood of a subsequent absence.[11]

Recognizing the elevated risk that is found with respect to the nursing profession, it is believed that more observational studies, specifically case-control and cohort, should continue to examine predictors of sickness absence. This is especially important considering that the labour laws and work duties are ever changing in the health care sector. Next, it is understood that each organization, whether a hospital or a community-based health network, operationalize sickness absence and their duration differently. However, unifying the definition and duration for research purposes could have favourable implications especially for improving employee wellness. Lastly, while examining studies collectively to quantify the likelihood of sickness absence was found to be possible and informative, it is important for qualitative efforts to also address some of the gaps in the extant literature.

**2.5 Conclusion**

It is understood that nurses and HCAs are integral members of the health care system. Their work exposes them to risks that are both physical and psychosocial in nature, which in turn can result in lost time from work. In this study, one demographic factor was found to predict sickness absence. More specifically, women have higher odds of sickness absence than men. Neither of the lifestyle factors (physical activity and sleep) was found to impact the risk of sickness absence; however, it is important for employers and policymakers to examine these factors among other inter-related factors.

With respect to physical health factors, all predictors were found to be statistically significant, such that nurses and HCAs who: (1) describe their overall health as poor; (2) have had previous sickness leaves; and/or (3) experience musculoskeletal pain are more likely to experience sickness absence. In terms of musculoskeletal pain, the risk was found to be significantly higher if the pain is situated in the back region. Speaking with employers, nurses, and HCAs about their experiences could further deepen our understanding of the risks they face as well as mediating factors that could interconnect and produce unfavourable outcomes.

## References


1. Garrosa E, Rainho C, Moreno-Jiménez B, Monteiro MJ. The relationship between job stressors, hardy personality, coping resources and burnout in a sample of nurses: a correlational study at two time points. *Int J Nurs Stud.* 2010;47(2):205-215. doi:10.1016/j.ijnurstu.2009.05.014.

2. Garrosa E, Moreno-Jiménez B, Liang Y, González JL. The relationship between socio-demographic variables, job stressors, burnout, and hardy personality in nurses: an exploratory study. *Int J Nurs Stud.* 2008;45(3):418-427. doi:10.1016/j.ijnurstu.2006.09.003.

3. Roelen CAM, Magery N, van Rhenen W, et al. Low job satisfaction does not identify nurses at risk of future sickness absence: results from a Norwegian cohort study. *Int J Nurs Stud.* 2013;50(3):366-373. doi:10.1016/j.ijnurstu. 2012.09.012.

4. Toh SG, Ang E, Devi MK. Systematic review on the relationship between the nursing shortage and job satisfaction, stress and burnout levels among nurses in oncology/haematology settings. *Int J Evid Based Healthc*. 2012;10(2):126-141. doi:10.1111/j.1744-1609.2012.00271.x.

5. Farquharson B, Allan J, Johnston D, Johnston M, Choudhary C, Jones M. Stress amongst nurses working in a health care telephone-advice service: relationship with job satisfaction, intention to leave, sickness absence, and performance. *J Adv Nurs*. 2012;68(7):1624-1635. doi:10.1111/j.1365-2648.2012.06006.x.

6. Toren O, Zelker R, Lipschuetz M, Riba S, Reicher S, Nirel N. Turnover of registered nurses in Israel: characteristics and predictors. *Health Policy*. 2012;105(2-3):203-213. doi:10.1016/j.healthpol.2012.03.002.

7. Dabboussy M, Uppal S. Work absences in 2011. *Statistics Canada Catalogue no. 75-001-X Perspectives on Labour and Income*. Ottawa, ON: *Statistics Canada*; March 2012:1-11.

8. Elstad JI, Vabø M. Job stress, sickness absence and sickness presenteeism in Nordic elderly care. *Scand J Soc Med.* 2008;36(5):467-474. doi:10. 1177/1403494808089557.

9. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence attributed to airway infections: a three month prospective study of nurses' aides. *Occup Med*. 2004;61(1):45-51.

10. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. *Introduction to Meta-Analysis*. Chichester, UK: John Wiley & Sons; 2009:1-2. doi:10.1002/9780470743386.

11. Duijts SFA, Kant I, Swaen GMH, van den Brandt PA, Zeegers MPA. A meta-analysis of observational studies identifies predictors of sickness absence. *J Clin Epidemiol.* 2007;60(11):1105-1115. doi:10.1016/j.jclinepi.2007.04.008.

12. Davey MM, Cummings G, Newburn Cook CV, Lo EA. Predictors of nurse absenteeism in hospitals: a systematic review. *J Nurs Manag.* 2009;17(3):312-330. doi:10.1111/j.1365-2834.2008.00958.x.

13. Gohar B, Larivière M., Lightfoot, N, Larivière, C, Wenghofer, E. An examination of the factors associated with sickness absence in nurses and nurses' aides. PROSPERO: international prospective register of systematic reviews. 2017. CRD42017071040.

14. O'Brien-Pallas L, Murphy GT, White S, Hayes L. Building the future: an integrated strategy for nursing human resources in Canada. *Research Synthesis Report*; 2005.

15. Canadian Nurses Association. *2010 Workforce Profile of Nurse Practitioners in Canada*.Ottawa, ON; CAN: 2012:1-15.

16. College of Nurses of Ontario. *Practice Standard: Nurse Practitioner*. Toronto, ON: College of Nurses of Ontario; 2018:1-2

17. Carryer J, Gardner G, Dunn S, Gardner A. The core role of the nurse practitioner: practice, professionalism and clinical leadership. *J Clin Nurs.* 2007; 16(10):1818-1825. doi:10.1111/j.1365-2702.2007.01823.x.

18. Whitaker SC. The management of sickness absence. *Occup Med.* 2001;58(6):420-424.

19. National Health Institute. National Health's Quality Assessment Tools for Observational Cohort and Cross-sectional Studies. Retrieved from: https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

20. Elm Von E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ*. 2007;335:806. doi:10. 1136/bmj.39335.541782.AD

21. Viera AJ. Odds ratios and risk ratios: What's the difference and why does it matter? *South Med J.* 2008;101(7):730-734. doi:10.1097/smj.0b013e31817a7ee4.

22. Borenstein M, Hedges L, Higgins J, Rothstein H. Comprehensive Meta-Analysis Version 3. Engelwood, NJ , Biostat; 2016.

23. Riley RD, Higgins JPT, Deeks JJ. Interpretation of random effects meta-analyses. *BMJ.* 2011;342:d549. doi:10.1136/bmj.d549

24. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. A basic introduction to fixed-effect and random-effects models for meta-analysis. *Res Synth Methods.* 2010;1(2):97-111. doi:10.1002/jrsm.12.

25. Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ*. 2003;327(7414):557-560. doi:10.1136/bmj.327.7414.557.

26. Bernal D, Campos-Serna J, Tobias A, Vargas-Prada S, Benavides F, Serra C. Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: a systematic review and meta-analysis. *Int J Nurs Stud.* 2015;52(2):635.

27. Huedo-Medina TB, Sánchez-Meca J, Marín-Martínez F, Botella J. Assessing heterogeneity in meta-analysis: Q statistic or $I^2$ index? *Psychol Methods.* 2006;11(2):193-206.

28. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med.* 2009;6(7):1-6.

29. Alexopoulos EC, Tanagra D, Detorakis I, et al. Knee and low back complaints in professional hospital nurses: occurrence, chronicity, care seeking and absenteeism. *Work*. 2011;38(4):329-335. doi:10.3233/WOR-2011-1136.

30. Smedley J, Egger P, Cooper C, Coggon D. Prospective cohort study of predictors of incident low back pain in nurses. *BMJ*. 1997;314(7089):1225-1225. doi:10.1136/bmj.314.7089.1225.

31. Rauhala A, Kivimäki M, Fagerström L, et al. What degree of work overload is likely to cause increased sickness absenteeism among nurses? Evidence from the RAFAELA patient classification system. 2007;57(3):286-295. doi:10.1111/j.1365-2648.2006.04118.x.

32. Ferreira RC, Griep RH, Fonseca M. A multifactorial approach to sickness absenteeism among nursing staff. *Revista Saúde Pública*. 2012;46(2):1-9.

33. Reis RJ, La Rocca PF, Silveira AM. Factors related to sickness absenteeism among nursing personnel. *Revista Saúde Pública*. 2003;37(5).

34. Rodriguez-Acosta RL, Richardson DB, Lipscomb HJ, et al. Occupational injuries among aides and nurses in acute care. *Am J Ind Med.* 2009;52(12):953-964. doi:10.1002/ajim.20762.

35. Eriksen W, Bruusgaard D. Physical leisure-time activities and long-term sick leave: a 15-month prospective study of nurses' aides. *J Occup Environ Med.* 2002;44(6):530-538.

36. Pompeii LA, Lipscomb HJ, Dement JM. Predictors of lost time from work among nursing personnel who sought treatment for back pain. *Work.* 2010;37(3):285-295. doi:10.3233/WOR-2010-1080.

37. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence: a three month prospective study of nurses' aides. *Occup Med*. 2003;60(4):271-278.

38. Nilsson A, Lindberg P, Denison E. Predicting of pain, disability, and sick leave regarding a non-clinical sample among Swedish nurses. *Scand J Pain.* 2010;1(3):160-166. doi:10.1016/j.sjpain.2010.05.029.

39. Carneiro IG, Ortega A, Borg V, Hogh A. Health and sickness absence in Denmark: a study of elderly-care immigrant workers. *J Immigr Minor Health.* 2010;12(1):43-52. doi:10.1007/s10903-008-9206-7.

40. Ware JE, Kosinski M, Turner-Bowker DM, Gandek B. *Studies of SF-12v2 Health Survey Users Manual for the SF-12-V2 Health Survey*. Lincoln, RI: Quality Metric; 2007.

41. Horneij EL, Jensen IB, Holmström EB, Ekdahl C. Sick leave among home-care personnel: a longitudinal study of risk factors. *BMC Musculoskelet Disord*. 2004;5(1):9. doi:10.1186/1471-2474-5-38.

42. Eriksen W. Work factors as predictors of intense or disabling low back pain; a prospective study of nurses' aides. *Occup Med*. 2004;61(5):398-404. doi:10.1136/oem.2003.008482.

43. Jensen JN, Karpatschof B, Labriola M, Albertsen K. Do fear-avoidance beliefs play a role on the association between low back pain and sickness absence? A prospective cohort study among female health care workers. *J Occup Environ Med.* 2010;52(1):85-90. doi:10.1097/JOM.0b013e3181c95b9e.

44. Lee D, Coustasse A, Sikula A Sr. Transformational leadership and workplace injury and absenteeism: analysis of a National Nursing Assistant Survey. *Health Care Manage Rev.* 2011;36(4):380-387. doi:10.1097/HMR.0b013e3182100bf7.

45. Rajbhandary S, Basu K. Working conditions of nurses and absenteeism: Is there a relationship? An empirical analysis using National Survey of the Work and Health of Nurses. *Health Policy*. 2010;97(2-3):152-159. doi:10.1016/j.healthpol.2010.04.010.

46. Hackett RD. Age, Tenure, and Employee Absenteeism. *Hum Relat*. 1990;43(7): 601-619. doi:10.1177/001872679004300701.

47. Häkkänen M, Viikari-Juntura E. Job experience, work load, and risk of musculoskeletal disorders. *Occup Med*. 2001;58(2):129-135. doi:10.1136/ oem.58.2.129.

48. Koolhaas W, van der Klink JJL, de Boer MR, Groothoff JW, Brouwer S. Chronic health conditions and work ability in the ageing workforce: the impact of work conditions, psychosocial factors and perceived health. *Int Arch Occup Environ Health*. 2013;87(4):433-443. doi:10.1007/s00420-013-0882-9.

49. Khawaja RA, Sikander R, Khawaja AA, Jareno RJ. Medically certified sickness absence among health care workers. *J Pak Med Assoc*. 2012;62(9)900-904.

50. Barmby TA, Ercolani MG, Treble JG. Sickness absence: an international comparison. *Econ J.* 2002;112(480):F315-F331. doi:10.1111/1468-0297.00046.

51. Laaksonen M, Martikainen P, Rahkonen O, Lahelma E. Explanations for gender differences in sickness absence: evidence from middle-aged municipal employees from Finland. *Occup Med*. 2008;65(5):325-330. doi:10.1136/oem. 2007. 033910.

52. Laaksonen M, Mastekaasa A, Martikainen P. Gender differences in sickness absence-the contribution of occupation and workplace. *Scand J Work Environ Health*. 2010;36(5):394-403. doi:10.5271/sjweh.2909.

53. Krantz G, Östergren P-O. Do common symptoms in women predict long spells of sickness absence? A prospective community-based study on Swedish women 40 to 50 years of age. *Scand. J Public Health*. 2002;30(3):176-183. doi:10.108 0/14034940210133816.

54. Franche R-L, Murray E, Ibrahim S, et al. Examining the Impact of Worker and Workplace factors on prolonged work absences among Canadian nurses. *J Occup Environ Med.* 2011;53(8):919-927. doi:10.1097/JOM.0b 013e3182255dea.

55. Gorman JM. Gender differences in depression and response to psychotropic medication. *Gend Med.* 2006;3(2):93-109.

56. Nilsson A, Denison E, Lindberg P. Life values as predictors of pain, disability and sick leave among Swedish registered nurses: a longitudinal study. *BMC Nurs.* 2011;10 (1):17. doi:10.1186/1472-6955-10-17.

57. Reed LF, Battistutta D, Young J, Newman B. Prevalence and risk factors for foot and ankle musculoskeletal disorders experienced by nurses. *BMC Musculoskelet Disord*. 2014;15(1):196. doi:10.1186/1471-2474-15-196.

58. Jordan G, Nowrouzi-Kia B, Gohar B, Nowrouzi B. Lost-time illness, injury and disability and its relationship with obesity in the workplace: a comprehensive literature review. *Saf Health Work.* 2016;29(5):749-766. doi:10.1016/ j.shaw.2014.12.00659.

59. Prince SA, Adamo KB, Hamel M, Hardt J, Connor Gorber S, Tremblay M. A comparison of direct versus self-report measures for assessing physical activity in adults: systematic review. *Int J Behav Nutr Phys Act*. 2008;5(1):56. doi:10.1186/1479-5868-5-56.

60. Bourbonnais R, Vinet A, Vezina M, Gingras S. Certified sick leave as a non-specific morbidity indicator: a case-referent study among nurses. *Br J Ind Med*. 1992;49(10):673-678.

61. de Castro, AB, Fujishiro K, Rue T, Tagalog EA, Samaco Paquiz L, Gee GC. Associations between work schedule characteristics and occupational injury and illness. *Int Nurs Rev*. 2010;57(2):188-194.

62. Flo E, Pallesen S, Magerøy N, et al. Shift work disorder in nurses – assessment, prevalence and related health problems. *PLoS ONE*. 2012;7(4):e33981-e33989. doi:10.1371/journal.pone.0033981.

63. Hanson RK, Bussiere MT. Predicting relapse: Meta-analysis of sexual offender recidivism studies. *J Consult Clin Psychol.* 1998;66(2):1-15.

64. Ferrie JE, Vahtera J, Kivimaki M, et al. Diagnosis-specific sickness absence and all-cause mortality in the GAZEL study. *J Epidemiol Community Health.* 2009;63(1):50-55. doi:10.1136/jech.2008.074369.

65. Vahtera J, Westerlund H, Ferrie JE, et al. All-cause and diagnosis-specific sickness absence as a predictor of sustained suboptimal health: a 14-year follow-up in the GAZEL cohort. *J Epidemiol Community Health.* 2010;64(4):311-317. doi:10.1136/jech.2008.083923.

66. Head J, Ferrie JE, Alexanderson K, Westerlund H, Vahtera J, Kivimaki M. Diagnosis-specific sickness absence as a predictor of mortality: the Whitehall II prospective cohort study. *BMJ*. 2008;337:a1469-a1469. doi:10.1136/bmj.a1469

67. Roelen CAM, Koopmans PC, Schreuder JAH, Anema JR, van der Beek AJ. The history of registered sickness absence predicts future sickness absence. *Occup Med.*. 2011;61(2):96-101. doi:10.1093/occmed/kqq181.

68. Kivimäki M, Ferrie JE, Hagberg J, et al. Diagnosis-specific sick leave as a risk marker for disability pension in a Swedish population. *J Epidemiol Community Health.* 2007;61(10):915-920. doi:10.1136/jech.2006.055426.

69. Pompeii LA, Lipscomb HJ, Schoenfisch AL, Dement JM. Musculoskeletal injuries resulting from patient handling tasks among hospital workers. *Am J Ind Med.* 2009;52(7):571-578.

70. Evanoff B, Wolf L, Aton E, Canos J, Collins J. Reduction in injury rates in nursing personnel through introduction of mechanical lifts in the workplace. *Am J Ind Med.* 2003;44(5):451-457. doi:10.1002/ajim.10294.

71. Garg A, Kapellusch JM. Long-term efficacy of an ergonomics program that includes patient-handling devices on reducing musculoskeletal injuries to nursing personnel. *Hum Factors.* 2012;54(4):608-625.

72. Carlson MDA, Morrison RS. Study design, precision, and validity in observational studies. *J Palliat Med.* 2009;12(1):77-82. doi:10.1089/jpm.2008.9690.

# CHAPTER 3:

## A Meta-Analysis of Mental Health, Organizational, and Work-Related Psychosocial Factors as Possible Predictors of Sickness Absence Among Nursing Staff

Basem GOHAR,[1] Michel LARIVIÈRE,[2] Nancy LIGHTFOOT,[3] Elizabeth WENGHOFER,[4] Céline LARIVIÈRE,[5] Behdin NOWROUZI-KIA.[6]

1 PhD Program in Interdisciplinary Rural and Northern Health, Laurentian University, Sudbury, ON, Canada.

2 School of Human Kinetics, Northern Ontario School of Medicine, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

3 School of Rural and Northern Health, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

4 School of Rural and Northern Health, Laurentian University, Sudbury, ON, Canada.

5 School of Human Kinetics, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

6 School of Rural and Northern Health, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada

Corresponding author: Basem Gohar, 935 Ramsey Lake Road. Laurentian University,

Sudbury, ON, Canada

**ABSTRACT:**

**Background**: The nursing profession is as a stressful occupation with physical and psychosocial stressors inherent in its practice. Correspondingly, there is a high prevalence rate of sickness absence in this profession compared to others. **Objective:** This paper sought to examine factors that could predict sickness absence among nurses and health care aides (HCAs). In this paper, psychosocial and organizational factors were explored in a systematic review and meta-analysis. **Methods:** A meta-analysis was undertaken to quantify the association between predictive variables and sickness absence. Using a registered protocol, keyword searches were used on five online databases: CINAHL, ProQuest Allied, ProQuest database theses, PsychINFO, and PubMed as well as study references. Further screening and quality testing were conducted to deem study eligibility. Odds ratios (ORs) and their corresponding confidence intervals (CIs) were pooled with their respective factors and analyzed using the random-effects model. Follow-up Cochrane $Q$ and $I^2$ were used to test heterogeneity and identify the degree of variability between studies. **Results:** From 812 studies that were examined with consideration of duplicates, eligibility, and sufficient statistical data, 22 studies were included for meta-analytic computations that examined one or more variables outlined in this undertaking. Poor mental health increased the odds of sickness absence (mostly anxiety: OR= 1.56; CI 95%= 1.07 – 2.28; $p$= .02; mostly depression: OR= 1.59; CI 95%= 1.02 – 2.04; $p$= .04). HCAs were also found to have greater odds of experiencing sickness absence compared to nurses (OR= 1.20; CI 95%= 1.10 – 1.30; $p$< .001). Other significantly predictive organizational factors included working night shift (OR= 1.47; CI 95%= 1.23 – 1.77; $p$< .001), working in pediatric (OR= 1.86; CI 95% 1.38 – 2.51;

$p$< .001) and psychiatric units (OR= 1.60; CI 95%= 1.18 – 2.18; $p$< .01). On the other hand, working in outpatient or surgical units was not found to be associated with sickness absence. For work-related psychosocial factors, nursing staff, whether experiencing physical or emotional fatigue, had greater odds of experiencing sick leave (OR= 1.53; CI 95% 1.14 – 2.06; $p$< .01). Neither job strain nor job satisfaction predicted sick leave. Job demand was predictive (OR= 1.57; CI 95%= 1.04 – 2.36; $p$< .05), but not job control. Furthermore, a supportive work environment significantly reduced the odds of time loss (OR= 0.58; CI 95%= 0.31 – 0.83; $p$< .05). Job strain ($I^2$= 30.56%) and job satisfaction ($I^2$= 43.08%) were deemed as moderately heterogeneous, while other factors were not statistically heterogeneous. **Conclusion:** The odds of sickness absence increase among nursing personnel due to poor mental health, working night shifts and working in pediatric and psychiatric units, being fatigued, experiencing high job demand; conversely, working in a supportive environment reduces the odds of sickness absence. These findings can help inform intervention strategies to mitigate sickness absences and improve well-being of nursing personnel.

## 3.1 Introduction

The nursing profession is considered a stressful occupation with physical and psychosocial stressors inherent in its practice.[1,2] At the same time, there has been an increase in demands within this particular profession.[3] These factors appear linked to high job turnover rates, staff shortages, and more pertinent to this undertaking, increased sickness absenteeism.[4-6]

There is some evidence suggesting that employees' overall health and safety has improved in recent years.[7] However, sickness absence remains problematic in the health care sector, especially with nursing staff.[7] Indeed, Canadian data demonstrates that among all full-time employees, nursing staff have the highest rates of sickness absence.[7] Specifically, nurses and health care aides (HCAs) were ranked as the highest in incident rates of illness and disability (10.6% & 10.8%), as well as in having the longest average of days lost per year (13.7 & 14.7).[7] Similarly, data from the Bureau of Labor of the United States are in line with Canadian data, as nurses and HCAs present with much higher injury rates and lost-time days compared to other occupational sectors.[8] Consistent with North American trends, British data demonstrated that nursing personnel were four times more likely to experience sickness absence than physicians.[9]

While there is evidence suggesting that sickness absence is an area of concern in the nursing population, research that has identified its predictors remain scant.[10] In fact, conflicting findings are found in the extant literature in terms of the correlates to sickness absence. For instance, results from a cross-sectional study from Brazil revealed that nurses and HCAs who suffer from mental health concerns such as anxiety or depression had twice the odds of experiencing long-term sickness absence (8+ days).[11] Conversely,

in a Dutch cross-sectional study, neither anxiety nor depression were found to increase the odds of time loss.[12] These divergent findings could be attributed to several factors including differences in job roles or duties. In any event, such contradictions prevent clear recommendations to researchers, practitioners, and policy makers who consult the literature for supportive evidence.

Quantitatively amalgamating the results from carefully selected studies offers an interesting opportunity to clarify contradictions in the literature relating to risk factors of sickness absence.[13] In particular, by using numerical estimates and statistical methods, (i.e., meta-analytic computations), overall estimates can be obtained and hence, determine the relative contribution of the identified predictors to sickness absence. As such, more studies can be considered simultaneously while yielding higher statistical power and thus generalizability.[13]

In reviewing previous research, only one study was identified where researchers applied meta-analytic computations to determine significant correlates of sickness absence.[14] The authors pooled employees with various job descriptions when examining sickness absence, including nurses and HCAs. While this study was helpful to find commonality in terms of risk factors and sickness absence, the findings could not accurately capture the nursing profession due to methodological issues, specifically the heterogeneity and the weight of other studies pooled in the analysis.

Our literature search identified one systematic review that studied nurses and absenteeism.[10] Although the researchers offered insight on factors related to absenteeism, there were no statistical computations that estimated overall effects. Secondly, the authors only included data on non-health related absences. Lastly, the authors only

included hospital-based nurses and therefore, other areas where nursing staff might work were not examined.

The current study investigated the determinants of sickness absence in nurses and HCAs, drawn from existing scientific literature. More specifically, epidemiological studies were pooled and statistically analyzed, investigating mental health, organizational, and work-related psychosocial factors.

## 3.2 Methods

### 3.2.1 Registration of Systematic Review and Protocol

As this is a systematic review of observational studies, this study was registered with the National Institute for Health Research's International Prospective Register of Systematic Reviews (PROSPERO).[15] A detailed protocol adapted from PROSPERO was used, which contains: 1) authors' information and affiliation; 2) review objectives; 3) search strategy; 4) date and language restrictions as well as inclusion/exclusion criteria; 5) quality testing procedures; 6) data extraction; and 7) data synthesis and statistical analysis.[15]

### 3.2.2 Search Strategy

Key searches were used to explore the predictors of sickness absence in nursing and HCAs. Keyword searches were kept expansive to identify as many predictive variables as possible. We used: CINAHL, ProQuest Allied, ProQuest database theses, PsychINFO, and PubMed as databases for our searches. Key word searches were entered into the databases for this review (Appendix A). During the database search, the command "OR" was used with key words: 'predict*', 'risk factor(s)', and 'risk*'. These possibilities were combined with (i.e., "AND" command) a list of possible keywords

(i.e., "OR" command): 'lost-time', 'time loss', 'sick time', 'sick* absen*', 'injur*', 'ill*', 'disab*', and 'sick*'. The two sets of key words were then meshed with (i.e., "AND" command) the word, 'nurs*'. A snowball strategy was also used such that the references of the studies cited in the identified papers were examined.

### 3.2.3 Inclusion and Exclusion Criteria

Titles and abstracts were reviewed for each article obtained in the search. A checklist, adapted from the Cochrane Guidelines, was used to determine the eligibility of each study examined.[16] Eligible studies were prospective observational (i.e., case-control, cohort, or cross-sectional) studies in the English language that examined the sickness of nursing personnel from January 1990 until December 2016. Dissertations and unpublished papers were also considered for inclusion based on the document's quality, which is explained in the subsequent section. Articles on absenteeism related to injury, physical or mental illnesses, which is referred to as sickness absence in this paper, were included. However, voluntary absenteeism (i.e., absence not related to sickness) was excluded.

Given the population of interest for this present study, the sample was limited to nursing staff. For this study, the term "nursing staff" was broadly defined as any health care worker who completes nursing duties.[17-19] This rationale was based on four reasons. Firstly, based on a review of the literature, researchers have often combined occupations similar to nursing in their analyses (e.g., nursing assistants, nurses' aides). Therefore, it is challenging to extract nurse data from participant samples. Secondly, nursing titles and duties appear to vary due to cultural and geographical reasons. Thirdly, there is quite a bit overlap in terms of the roles of the positions included in this paper and thereby, by

pooling them statistical power is increased for meta-analytic purposes. Finally, capturing nursing positions with overlapping roles (e.g., registered nurse, registered practical nurses), would produce a more comprehensive list of variables that could predict sickness absence in nurses and HCAs, which in turn would provide a greater understanding of risk factors for the profession. Nurse practitioners (NPs) were excluded because they are specialized nurses with a broad scope of practice, in contrast to other nursing staff, who also represent a small percentage of the nursing population.[20] NPs can diagnose and prescribe medication such that their inclusion might distort the results of this study. In addition, the role of an NP was found to be relatively new in some areas such that its scope of practice is not clearly defined globally.[21] Articles that included other occupations in conjunction with nursing staff (e.g., physicians) were excluded, unless the sample sizes and effect sizes of sickness absence were presented independently by occupation type. Despite their exclusion, references of studies that examined sickness absence of nursing staff with other occupational groups were verified, which in turn would minimize selection biases.

### 3.2.4 Quality Testing and Data Extraction

The quality of eligible articles was individually assessed by two reviewers using the National Institutes of Health's Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIH, 2016).[22] Strengthening the Reporting of Observational Studies in Epidemiology (STROBE, 2007)[23,24] was also used as part of the quality testing procedure. The inter-rater reliability score of 83% by calculating the percentage of consistency between the two raters. Any inconsistencies between the reviewers were discussed in detail until a consensus was reached.

The following information was entered into a Microsoft Excel spreadsheet: 1) identification code; 2) year of publication; 3) first author; 4) country origin; 5) study design; 6) sample information; 7) independent variable(s) along with types of measurement tools (e.g., psychological assessments); 8) dependent variable(s) and duration of sickness absence; 9) type of analysis used and presented effect sizes; 10) conclusion; and 11) any potential conflict of interest such as competing interest or financial gains.[13]

### 3.2.5 Definition of Terms

In this undertaking, sickness absence was the dependent variable. Sickness absence was operationally defined as absence from work that is attributed to sickness by the employee and also approved by the employer.[24] Voluntary absences, including maternity leaves or other reasons that were not due to sickness absence, were not considered for this study. In the literature, some studies categorized sickness absence duration as short-term and long-term, with no consensus in terms of absence duration. Given the lack of consistency between studies, longer durations were selected if studies reported more than one time frame. This decision was made as it was expected that longer durations might be less influenced by those factors that lead to short-term sickness absence.

Predictors (independent variable) of sickness absence had to be clearly stated in the articles. Lastly, studies had to present sufficient statistical data such as effect sizes, along with the associated standard error for inclusion. If effect sizes were not presented, the author of the paper was contacted. Studies were removed if statistical results were insufficient to obtain or calculate effective sizes.

This study has three primary independent variables: (1) mental health, (2) organizational factors, and (3) work-related psychosocial variables. The term "mental health" was used as an overarching term for various psychosocial constructs. In one study, the authors used the Mental Health Inventory as their instrument, which combines both anxiety and depression into one overall score.[12] In another study, the authors used the Self-Reporting Questionnaire, which incorporates symptoms that are closely related to both anxiety and depression.[11] The term psychological distress was used in studies that used the SF-20 as their psychometric measure.[25,26] Reportedly, psychological distress incorporates anger, anxiety, depression, and cognitive disturbance. In other studies, the authors examined anxiety and/or depressive symptoms with less clinical focus such as answering "yes" or "no" to "Do you experience low mood?" or "Do you feel nervous often?"[27,28]

Organizational factors are elements related to the operational and systemic aspects of the workplace. Such factors include job duty (i.e., nurse vs. HCA), type of shift, and the department or unit where the staff members work. Work-related psychosocial factors describe elements of the workplace that affect the employee's emotional well-being. These include fatigue, job satisfaction, job strain (high-demand/low control), and workplace support. Fatigue was operationalized in this study as experiencing physical or emotional exhaustion.

### 3.2.6 Statistical Analysis

For this study, adjusted odds ratios (ORs) and their corresponding confidence intervals (CIs) were pooled. Studies that reported findings as rate ratios were treated as ORs.[14] Studies that reported findings as risk ratios or relative risks (RR) were also

treated as ORs, unless the specific predictor was a "common" effect, attributing more than 10% of the sample and had significant effect size that was either below 0.5 or above 2.5.[29] Such effect sizes were not pooled in the analyses, as there is a risk of over or underestimating the effect if treated as ORs. Results from studies that were derived from correlational studies were not combined in the pooled sample. Borenstein et al., (2009) explained that it is not ideal to pool observational studies reporting ORs and correlations together, as they would be substantially different.[18]

ORs from at least three studies reporting statistical data on a predictive factor to sickness absence were pooled. However, some studies reported several predictors and thus, data were pooled accordingly. Extracted data were imported to Comprehensive Meta-analysis version 3.0 software (CMA 3.0, 2016)[30] and were computed by applying a random-effects model. Unlike its counterpart, (i.e., a fixed-effect model), the random-effects analysis assumes that the true effect size differs from one study to another.[18,31] This is important for this study, as not all participants shared the same characteristics (e.g., education, responsibilities etc.), data were not obtained or measured similarly, and thus, employing a random-effects model is the appropriate method in this instance. Accordingly, the studies included in the analysis represent a random sample of effect sizes that could have been observed. Moreover, when computing a random-effects model, its summary effect is the mean estimate of the presented effects. Finally, the alpha level was set at 0.05.

Follow-up statistical computations were conducted to test for heterogeneity including the variation in study outcomes between studies for each variable. Specifically, Cochrane $Q$ and $p$ values were used to examine heterogeneity with alpha level set at 0.05.[32] In

addition, the ratio of true heterogeneity to total observed variation was examined using $I^2$ percentages. $I^2$ percentages up to 25% were determined as low. Percentages greater than 25, but lower than 75 were deemed as moderate, while percentages of 75 were labelled as high. Together, Cochrane $Q$ and $I^2$, offer an understanding of heterogeneity, which helps to interpret the meta-analytic results better. Although Cochrane $Q$ is sensitive to the number of studies pooled in the analysis, $I^2$ is not.[13] Moreover, $I^2$ considers the level of variation between studies, while Cochrane $Q$ simply serves as a test of significance.[13]

## 3.3 Results

### 3.3.1 Study Characteristics

The Preferred Reporting of Systematic Reviews and Meta-Analysis (PRISMA) Flow Diagram is used to depict the selection of studies (Figure 1).[33] The initial search yielded 1,323 studies. Upon removing duplicates, 812 studies were vetted for eligibility by examining titles and abstracts. Eligible references obtained from a snowballing effect added 158 studies. A total of 53 epidemiological studies of predictive factors to sickness absence among nurses and HCAs were found to be relevant. Of those articles, 24 studies were excluded due to insufficient statistical data, while two additional studies were omitted following quality testing, leaving a total of 27 studies that were included in the analyses. For this paper, 22 studies included data on mental health, organizational, and work-related psychosocial predictors. One of the identified studies had two separate populations included in their research,[34] and therefore added one more to the overall sample (N= 23).

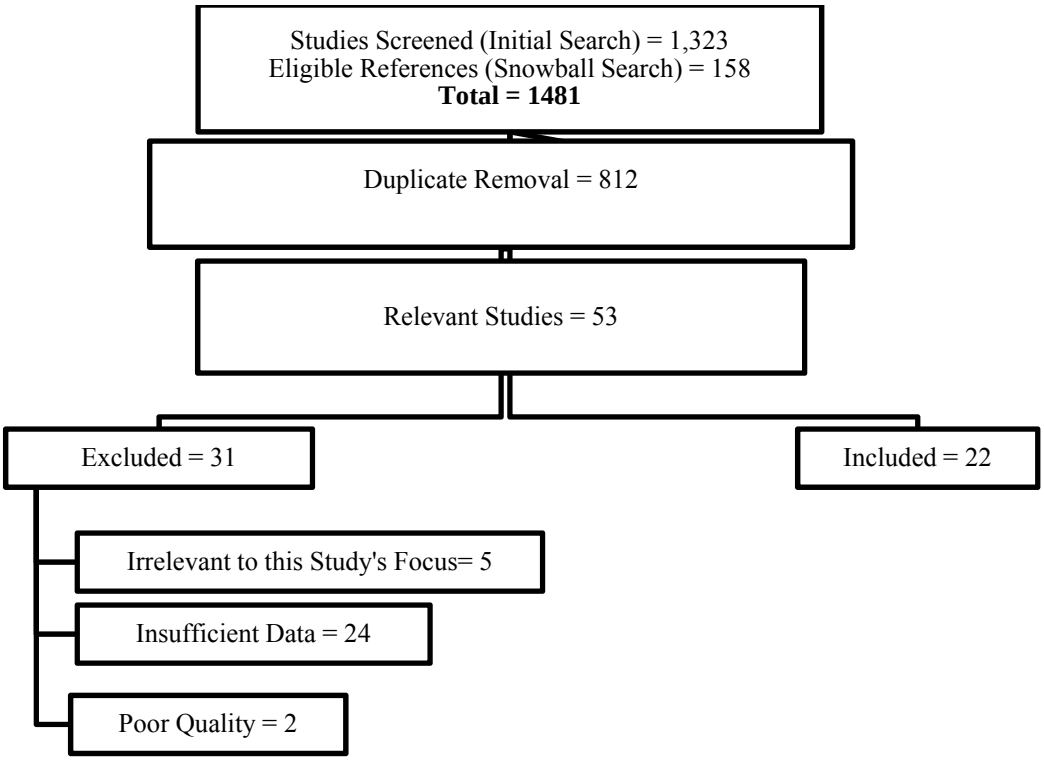


**Figure 1**. PRISMA Flow Diagram of Studies Included and Excluded for Chapter 3[33]

Of the 22 studies pooled for this undertaking, three were case-control, ten were cohort, and nine were cross-sectional designs. Over one-half of the studies were from European countries (n= 13) of which almost half originated from Scandinavian countries (n= 6). Other European countries included in this analysis were from Belgium (n= 2), Greece (n= 1), the Netherlands (n= 2), Spain (n=1), and England (n= 1). Six studies were conducted in North America: four from Canada and two from the United States. One Brazilian study was included as were one from Taiwan, and one from the Philippines.

All participants were either nurses or HCAs (including titles such as health care workers and elderly care workers). The studies were carried out in a wide range of health care settings including hospitals, community-based settings, and outpatient settings. Sufficient statistical data were obtained for those variables relating to mental health (mainly anxiety and depression), organizational information (i.e., job title, shift work, and

unit placement), as well as workplace-related psychosocial factors (i.e., fatigue, job strain, job satisfaction, and work support). Below is a table depicting the characteristics of each study.

| First Author, year | Study Design | Origin | Profession | Setting | Predictor(s) | Measure(s) |
|---|---|---|---|---|---|---|
| Alexopoulus, 2011[35] | Cross-sectional | Greece | Nurses | Hospital | Job Demand, Job Control, Work Support | Survey |
| Bourbonnais, 2001[36] | Cohort | Canada | Nurses | Hospital | Mental Health, Fatigue, Job Strain, Work Support, Working Pediatrics, Job Strain | French version of Psych Distress, Maslach Burnout Inventory, Job Content Questionnaire (French Version) |
| Bourbonnais, 1992[37](a) | Case-Control | Canada | Nurses | Hospital | Shift Work, Working Outpatient, Working Psychiatric Unit | Survey |
| Bourbonnais, 1992[25](b) | Case-Control | Canada | Nurses | Hospital | Shift Work, Working Outpatient, Working Pediatrics, Working Psychiatric Unit | Survey |
| de Castro, 2010[38] | Cross-sectional | Philippines | Nurses | Various Settings | Shift Work, Work Support | Survey |
| Eriksen, 2004[39](a) | Cohort | Norway | Nurses' Aides | Various settings | Working Pediatrics, Work Support | Survey |
| Eriksen, 2004[40](b) | Cohort | Norway | Nurses' Aides | Various settings | Shift Work, Fatigue, Job Demand, Work Support | Survey/ General Nordic Questionnaire for Psychological and Social Factors |
| Eriksen, 2003[41] | Cohort | Norway | Nurses' Aides | Various settings | Working in Psychiatric Unit, Work in Pediatric Unit, Work Support, Fatigue | Survey/ General Nordic Questionnaire for Psychological and Social Factors at Work |
| Feng, 2007[42] | Cross-sectional | Taiwan | Nurses' Aides | Nursing Home | Job Satisfaction, Work Support | Chinese version of Job Content Questionnaire |
| Ferreira, 2012[11] | Cross-sectional | Brazil | Nurses & Nurses' Aides | Hospital | Mental Health, Nurse vs. Nurses' Aide, Shiftwork | Survey |
| Gorman, 2010[43] | Cross-sectional | Canada | Nurses & Nurses' Aides | Various Settings | Nurse vs. Nurse Aide | Survey |
| Horneij, 2004[34]* | Cohort | Sweden | Female Nurses' Aides | Home-Care | Mental Health, Job Strain, Job Demand, Job Control, Work Support | Survey |
| Nilsson, 2010[44] | Cohort | Sweden | Nurses | Hospital | Job Strain, Job Satisfaction | Survey |
| Pompeii, 2010[45] | Cohort | USA | Nurses & Nurses' Aides | Hospital/Tertiary Care | Mental Health, Nurse vs. Nurse Aide, Working Outpatient, Fatigue, Job Strain | Data |
| Reis, 2003[46] | Cross-sectional | Spain | Nurses & Nurses, Aides | Hospital | Nurse vs. Nurse Aide | Database |
| Roelen, 2013[3] | Cohort | Norway | Nurses | Hospital, Nursing Homes, & Ambulant Care | Job Satisfaction | Job Satisfaction Index |
| Roelen, 2009(b)[26] | Cross-sectional | Netherlands | Nurses & Nurses' Aides | Hospital | Mental Health, Job Demand, Job Control, Work Support | Survey/SF-20/Dutch Job Content Questionnaire, Dutch Effort-Reward Imbalance Questionnaire |
| Rodriguez- | Cohort | USA | Nurses & | Hospital | Working Pediatrics, | Survey |

| | | | | | | |
|---|---|---|---|---|---|---|
| Acosta, 2009[47] | | | Nurses' Aides | | Working Psychiatric Unit | |
| Schreuder, 2010[12] | Cross-sectional | Netherlands | Female Nurses | Hospital | Mental Health, Job Strain, Work Support, | Survey, Mental Health Inventory (MHI-5), SF-12, Dutch Job Content Questionnaire |
| Smedley, 1997[28] | Cohort | United Kingdom (England) | Nurses | Hospital | Mental Health, Fatigue, Job Strain | Survey |
| Trybou, 2014[48] | Cross-sectional | Belgium | Nurses | Various Settings | Job Strain | Data/Job Content Questionnaire |
| Verhaeghe, 2003[49] | Case-Control | Belgium | Nurses' Aides | Hospital | Job Strain, Job Control, Work Support | Job Content Questionnaire |

**Table 1**. Characteristics of the Studies Pooled in the Meta-Analysis
* Two Independent Samples

### 3.3.2 Predictors of Sickness Absence

#### *Mental Health Variables*

Overall, there were eight studies (n= 8) that examined the impact of mental health on sickness absence. Three studies examined various mental health conditions and were presented as one overall score,[11,26,36] two studies examined both anxiety and depression separately,[12,45] one study (two samples) examined only anxiety,[34] and one study investigated depression solely. Given the variation in how the information was presented, two analyses were conducted: one using mental health factors combined with anxiety (Table 2), and the second using mental health factors combined with depression (Table 3). Results of mental health factors and anxiety were shown to increase the odds of sickness absence (OR= 1.56; CI 95%= 1.07 – 2.28; $p$= .02). Similarly, mental health factors along with the experiencing of depressive symptoms increased the likelihood of lost time (OR= 1.59; CI 95%= 1.02 – 2.49; $p$= .04).

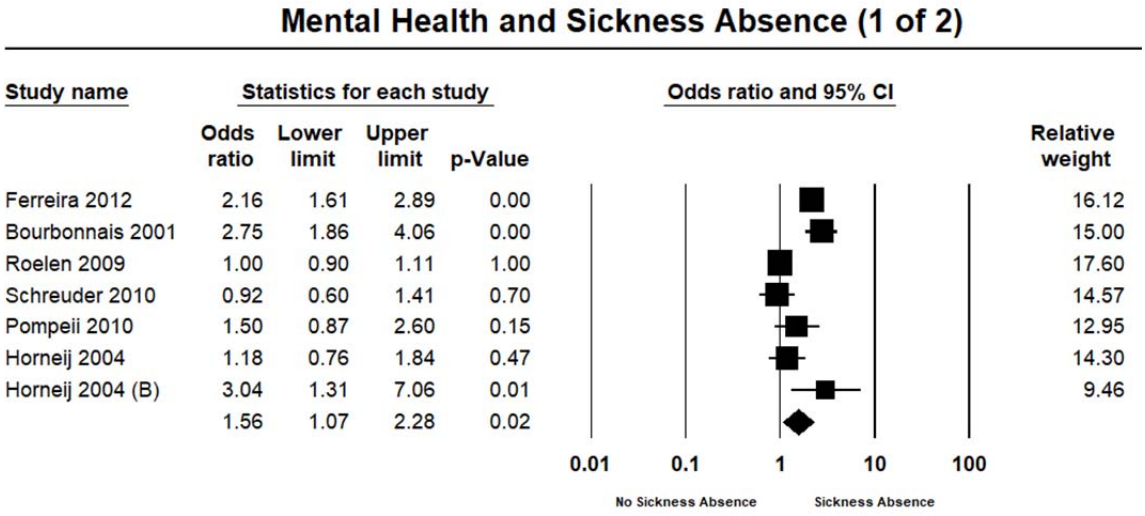


**Table 2. Meta-analysis of Poor Mental Health (Mostly Anxiety) and Sickness Absence**

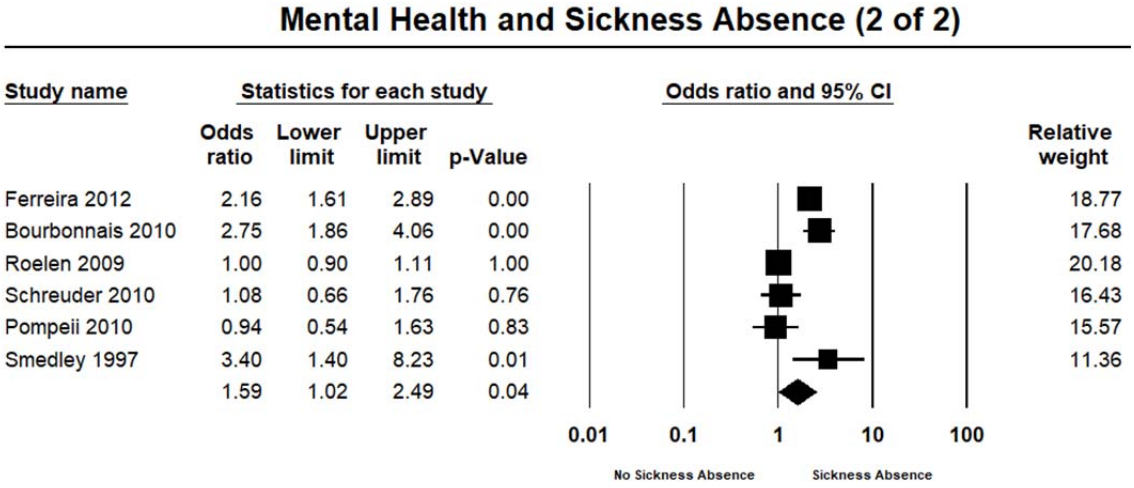


**Table 3. Meta-analysis of Poor Mental Health (Mostly Depression) and Sickness Absence**

### *Organizational Variables*

Four studies examined the difference in sickness absence and job titles of nursing personnel, specifically between nurses and HCAs (Table 4). In their research, authors used nurses as the reference group. Results revealed HCAs had greater odds of sickness absence in comparison to nurses (OR= 1.20; CI 95%= 1.10 – 1.30; $p< .001$). A total of 5 studies examined the effects of night shift on sickness absence (Table 5). Results were

also statistically significant, indicating that working night shift increased the odds of lost time when compared to day shift workers by an OR of 1.47 (CI 95%= 1.23 – 1.77; $p<$ .001). The department or unit placement where nurses and HCAs work was explored as a possible predictive variable of sickness absence. For this undertaking, there was sufficient statistical information to report on those who worked outpatient, pediatric units, psychiatric units, and surgical units. A total of four studies examined the odds of sickness absence among nursing staff working outpatient (Table 6). In two studies, the participants selected "yes" or "no" if they worked in an outpatient unit,[39,41] and one study used a surgical unit as their reference group for those working in an outpatient unit.[45] Working outpatient was not found to be predictive of sickness absence in nurses (OR= 1.25; CI 95%= 0.77 – 2.03; $p$= .37).

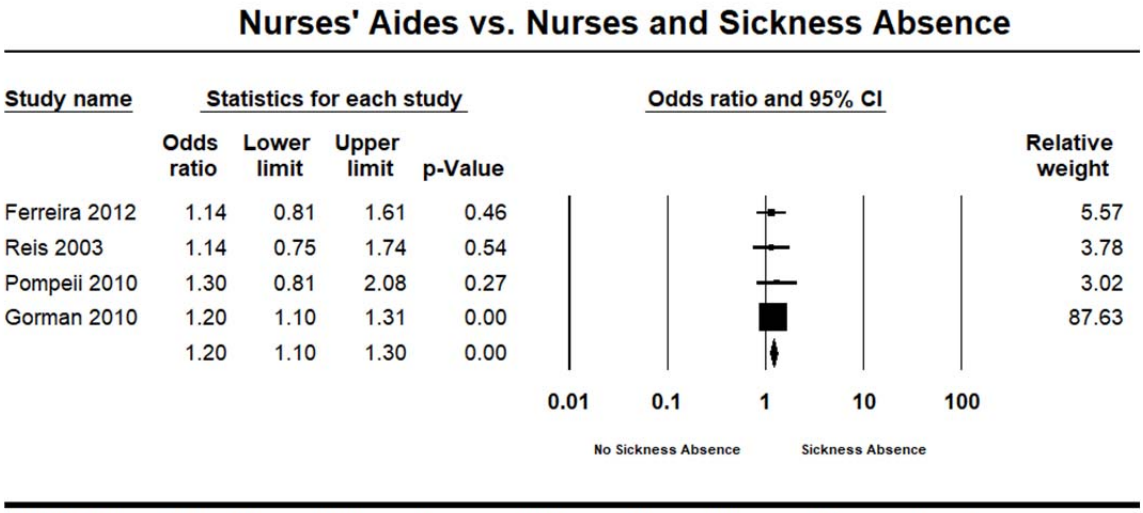


Table 4. Meta-analysis of Nurses' Aides vs. Nurses and Sickness Absence (Nurses= Reference Group)

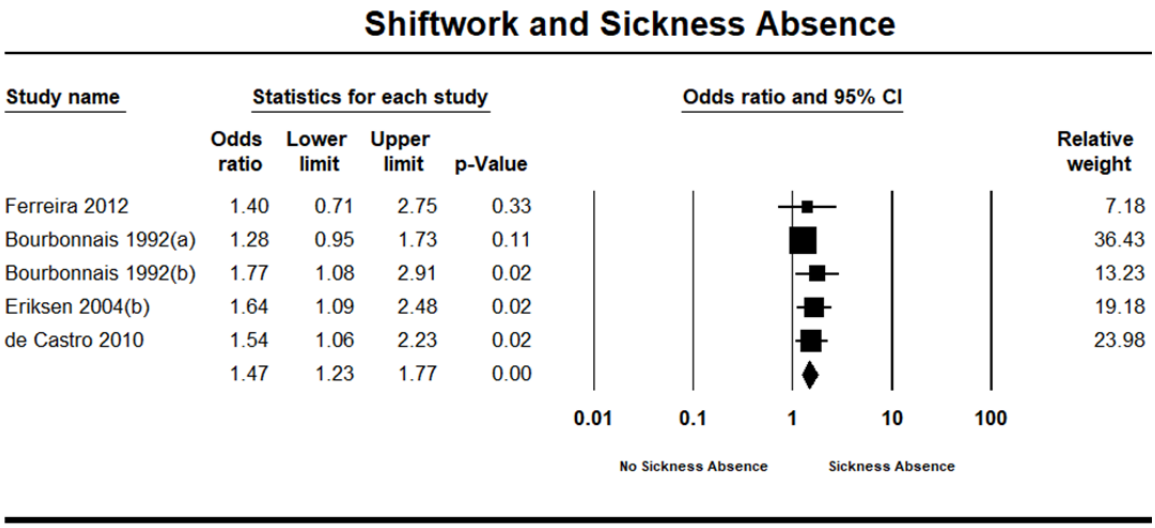


**Table 5. Meta-analysis of Shiftwork, Specifically Night Shift and Sickness Absence**

Nurses and HCAs working in pediatric units (Table 7) had greater odds of sickness absence (OR= 1.86; CI 95% 1.38 – 2.51; $p< .001$). All four studies demonstrated this finding, two of which were statistically significant. In two studies, the participants had to indicate "yes" or "no" if they worked in a pediatric unit,[39,41] while the other two were compared to a reference group classified as "varied" (i.e., nursing staff not in a specific unit).[25,56] For studies that looked at nursing staff working in psychiatric units (Table 8), participants were compared to the varied reference group in two studies.[25,56] In another study, participants indicated "yes" or "no" for working in a psychiatric unit,[41] and one study used neonatal care as the reference group.[47] Working in a psychiatric unit was also predictive of sickness absence with OR of 1.6 (CI 95%= 1.18 – 2.18; $p< .01$). Working in a surgical unit was not found to significantly increase the likelihood of sickness absence among nursing staff (OR= 1.38; CI 95%= 0.75 – 2.52; $p= 0.3$).

## Working Outpatient and Sickness Absence

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Bourbonnais 1992(a) | 1.70 | 1.12 | 2.58 | 0.01 | 51.79 |
| Bourbonnais 1992(b) | 1.02 | 0.43 | 2.40 | 0.96 | 23.01 |
| Pompeii 2010 | 0.80 | 0.36 | 1.79 | 0.59 | 25.20 |
| | 1.25 | 0.77 | 2.03 | 0.37 | |

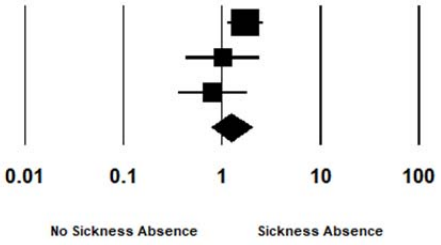


Table 6. Meta-analysis of Working Outpatient and Sickness Absence

## Working in a Pediatric Unit and Sickness Absence

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Bourbonnais 1992(a) | 1.71 | 0.99 | 2.96 | 0.05 | 29.91 |
| Bourbonnais 1992(b) | 1.32 | 0.45 | 3.91 | 0.62 | 7.62 |
| Eriksen 2003 | 1.73 | 1.03 | 2.91 | 0.04 | 33.26 |
| Eriksen 2004(a) | 2.42 | 1.39 | 4.21 | 0.00 | 29.21 |
| | 1.86 | 1.38 | 2.51 | 0.00 | |

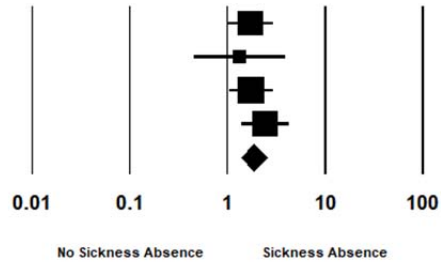


Table 7. Meta-analysis of Working in a Pediatric Unit and Sickness Absence

## Working in a Psychiatric Unit and Sickness Absence

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Bourbonnais 1992(a) | 1.60 | 0.93 | 2.76 | 0.09 | 24.60 |
| Bourbonnais 1992(b) | 2.05 | 0.78 | 5.38 | 0.14 | 9.29 |
| Rodriguez-Acosta 2009 | 4.30 | 1.30 | 14.26 | 0.02 | 6.20 |
| Eriksen 2003 | 1.39 | 1.07 | 1.81 | 0.01 | 59.91 |
| | 1.60 | 1.18 | 2.18 | 0.00 | |

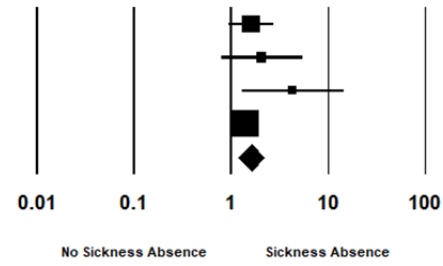


Table 8. Meta-analysis of Working in a Psychiatric Unit and Sickness Absence

***Work-Related Psychosocial Variables***

Five studies examined the impact of fatigue. Four studies measured fatigue using a survey format (e.g., "Do you often feel fatigued?")[28,41,45] and one looked at emotional exhaustion.[36] Results revealed that physical or mental fatigue (Table 9) were predictive of sickness absence (OR= 1.53; CI 95%= 1.14 – 2.79; $p< 0.01$). Results also revealed that physical fatigue was statistically significant independent from emotional exhaustion (OR= 1.38; CI 95%= 1.06 – 1.78; $p< 0.05$).

**Fatigue and Sickness Absence**

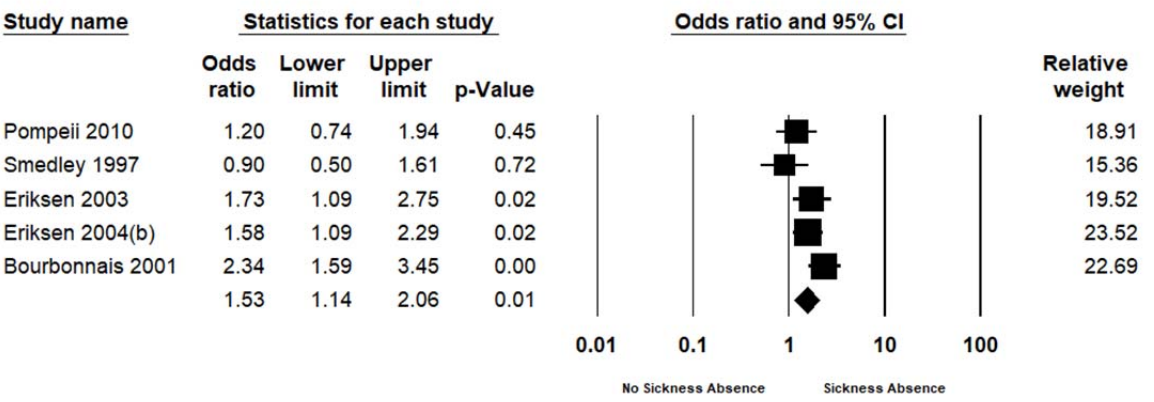


**Table 9. Meta-analysis of Increased Physical and Mental (i.e., Emotional Exhaustion) and Sickness Absence**

A total of nine studies (n= 9) were pooled to investigate the impact of increased job strain on sickness absence (Table 10). The overall effect did not reveal a strong relationship (OR= 1.20; CI 95%= 0.94 – 1.52; $p= 0.15$). When exploring the effects of job demand and control on sickness absence independently, results revealed that high demand (Table 11) approached level of significance (OR= 1.57; CI 95%= 1.04 – 2.36; $p< .05$), while high control (Table 11) did not (OR= 0.79; CI 95%= 0.55 – 1.12; $p= 0.19$). Moreover, increased job satisfaction (Table 12) did not reduce the odds of sickness absence in this set of studies (OR= 0.99; CI 95%= 0.93 – 1.06; $p= 0.80$).

## Job Strain and Sickness Absence

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Schreuder 2010 | 0.73 | 0.33 | 1.63 | 0.44 | 6.56 |
| Trybou 2014 | 2.30 | 1.12 | 4.71 | 0.02 | 7.66 |
| Pompeii 2010 | 0.95 | 0.65 | 1.38 | 0.79 | 14.85 |
| Smedley 1997 | 0.60 | 0.30 | 1.20 | 0.15 | 8.01 |
| Bourbonnais 2001 | 1.24 | 0.70 | 2.20 | 0.46 | 10.06 |
| Verhaeghe 2003 | 2.37 | 1.31 | 4.28 | 0.00 | 9.73 |
| Nilsson 2010 | 1.01 | 0.98 | 1.04 | 0.51 | 22.98 |
| Horneij 2004 | 1.16 | 0.76 | 1.77 | 0.49 | 13.65 |
| Horneij 2004 (B) | 2.35 | 1.05 | 5.26 | 0.04 | 6.51 |
| | 1.20 | 0.94 | 1.52 | 0.15 | |

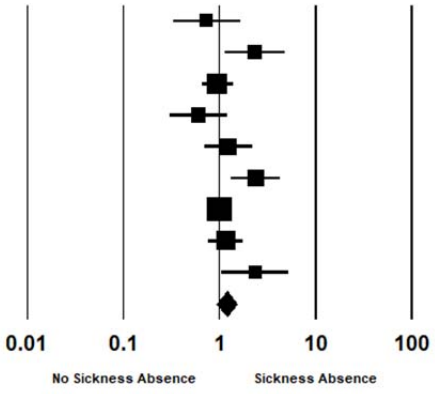


**Table 10. Meta-analysis Investigating the Role of High Job Strain and Sickness Absence**

## Job Demand and Sickness Absence

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Alexopoulos 2011 | 4.60 | 1.57 | 13.49 | 0.01 | 10.14 |
| Eriksen 2004 | 1.61 | 0.86 | 3.01 | 0.14 | 18.89 |
| Horneij 2004 | 1.44 | 0.96 | 2.16 | 0.08 | 25.35 |
| Horneij 2004(b) | 2.15 | 0.97 | 4.77 | 0.06 | 14.84 |
| Roelen 2009 | 1.00 | 0.80 | 1.25 | 1.00 | 30.78 |
| | 1.57 | 1.04 | 2.36 | 0.03 | |

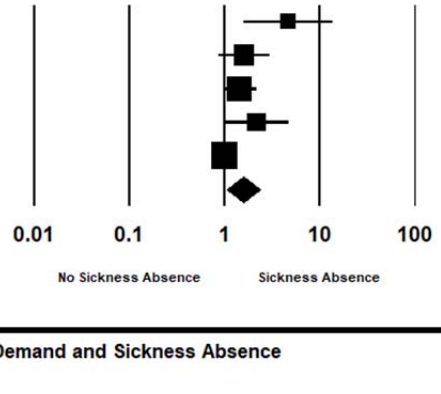


**Table 11. Meta-analysis Investigating the Role of High Job Demand and Sickness Absence**

## Job Control and Sickness Absence

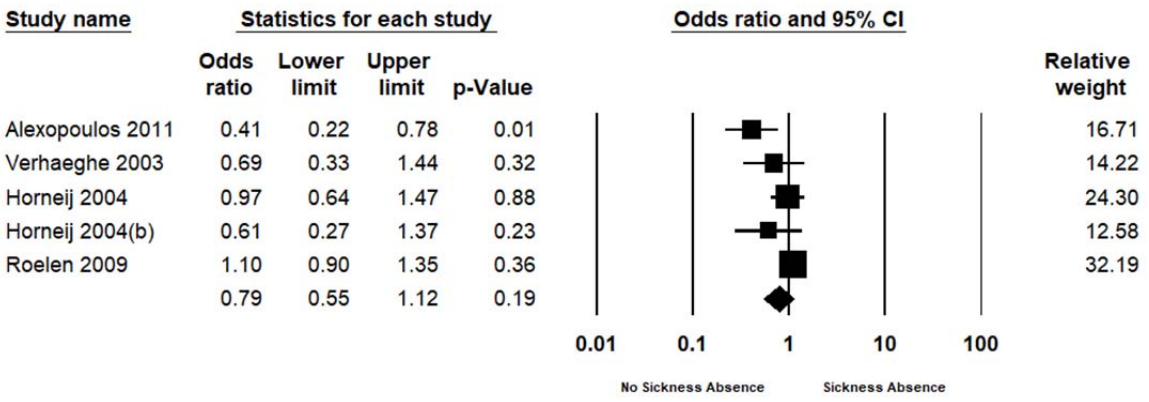


Table 12. Meta-analysis Investigating the Role of High Job Control and Sickness Absence

## Job Satisfaction and Sickness Absence

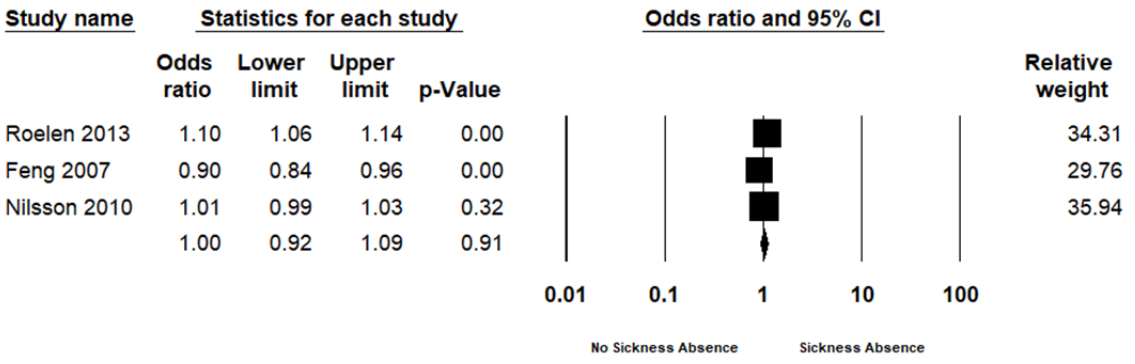


Table 13. Meta-analysis Investigating the Role of High Job Satisfaction and Sickness Absence

There was sufficient statistical information to investigate the impact of work support offered by the employer or co-workers bi-directionally (i.e., high support and low/no support). Firstly, an inverse association was found as support increased (Table 14) with lower odds of sickness absence (OR= 0.58; CI 95%= 0.41 – 0.83; $p< .01$). Similarly, when pooling other studies that examined the impact of low/no work support (Table 15), odds of sickness absence increased (OR= 1.36; CI 95%= 1.10 – 1.69; $p< .01$).

## Work Support and Sickness Absence (1 of 2)

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Feng 2007 | 0.53 | 0.39 | 0.72 | 0.00 | 31.56 |
| Vergaeghe 2003 | 0.30 | 0.13 | 0.69 | 0.00 | 12.62 |
| Horneij 2004 | 0.94 | 0.61 | 1.45 | 0.78 | 25.45 |
| Horneij 2004 (B) | 0.77 | 0.32 | 1.83 | 0.55 | 11.98 |
| Eriksen 2004(b) | 0.46 | 0.25 | 0.85 | 0.01 | 18.39 |
| | 0.58 | 0.41 | 0.83 | 0.00 | |

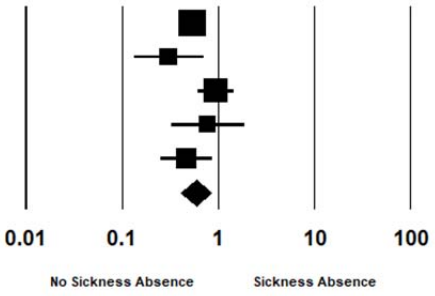


Table 14. Meta-analysis Investigating a Highly Supportive Work Environment and Sickness Absence

## Work Support and Sickness Absence (2 of 2)

| Study name | Odds ratio | Lower limit | Upper limit | p-Value | Relative weight |
|---|---|---|---|---|---|
| Schreuder 2010 | 1.25 | 1.03 | 1.52 | 0.02 | 20.79 |
| Alexopoulos 2011 | 3.13 | 1.12 | 8.76 | 0.03 | 3.69 |
| Eriksen 2003 | 1.73 | 1.28 | 2.34 | 0.00 | 16.76 |
| Eriksen 2004(a) | 1.78 | 1.21 | 2.61 | 0.00 | 13.88 |
| Bourbonnais 2001 | 1.27 | 1.06 | 1.53 | 0.01 | 21.19 |
| Roelen 2009 | 1.00 | 0.90 | 1.11 | 1.00 | 23.67 |
| | 1.36 | 1.10 | 1.69 | 0.00 | |

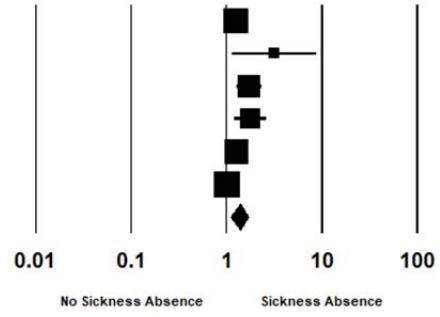


Table 15. Meta-analysis Investigating the Role of Low/No Workplace Support and Sickness Absence

### 3.3.3 Heterogeneity Testing

By way of Cochrane *Q*, no variables were deemed statistically heterogeneous ($p \geq 0.05$). Using the $I^2$ statistic, high job strain ($I^2 = 30.56\%$) and high job satisfaction ($I^2 = 43.08$) were described as moderately variable. Other variables had little to no variation between studies within each variable ($I^2 \leq 25\%$). Please see Table 16 for a summary of

variables assessed with corresponding effect sizes, confidence intervals, degrees of freedom, Cochrane *Q*, and $I^2$.

| Variable | OR | CI Lower Limit | CI Upper Limit | *P* | *Q* df | *Q* | *P* | $I^2$ |
|---|---|---|---|---|---|---|---|---|
| Poor Mental Health (Anxiety) | 1.56 | 1.07 | 2.28 | <.05 | 6 | 5.22 | 0.52 | 0% |
| Poor Mental Health (Depression) | 1.59 | 1.02 | 2.04 | <.05 | 5 | 4.74 | 0.32 | 0% |
| Health Care Aides | 1.20 | 1.10 | 1.30 | <.01 | 3 | 0.25 | 0.97 | 0% |
| Shift Work (Night) | 1.47 | 1.23 | 1.77 | <.01 | 4 | 1.70 | 0.79 | 0% |
| Unit (Outpatient) | 1.25 | 0.77 | 2.03 | 0.37 | 2 | 1.79 | 0.41 | 0% |
| Unit (Pediatrics) | 1.86 | 1.38 | 2.51 | <.01 | 3 | 1.42 | 0.70 | 0% |
| Unit (Psychiatric) | 1.60 | 1.18 | 2.18 | <.01 | 3 | 3.17 | 0.37 | 5.43% |
| Unit (Surgical) | 1.38 | 0.75 | 2.52 | 0.30 | 2 | 1.70 | 0.43 | 0% |
| Increased Fatigue | 1.53 | 1.14 | 2.06 | .01 | 4 | 4.23 | 0.38 | 5.50% |
| High Job Strain | 1.20 | 0.94 | 1.52 | 0.15 | 8 | 11.52 | 0.17 | 30.56% |
| High Job Demand | 1.57 | 1.04 | 2.36 | .03 | 4 | 4.51 | 0.34 | 11.25% |
| High Job Control | 0.79 | 0.55 | 1.12 | 0.19 | 4 | 3.86 | 0.57 | 0% |
| High Job Satisfaction | 1.00 | 0.92 | 1.09 | 0.91 | 2 | 3.51 | 0.83 | 43.08% |
| High Work Support | 0.58 | 0.41 | 0.83 | <.01 | 4 | 4.13 | 0.61 | 3.14% |
| Low Work Support | 1.37 | 1.10 | 1.69 | <.01 | 5 | 5.88 | 0.32 | 14.94% |

**Table 16**. Analysis of Heterogeneity Using Cochrane *Q* and $I^2$

## 3.4 Discussion

### 3.4.1 Interpretation of Findings

By way of meta-analytic methodologies, this paper aimed to investigate mental health, organizational, and work-related psychosocial factors from the extant literature that could predict sickness absence among nurses and HCAs. Results from this study suggest that poor mental health is a fairly cogent predictor of absenteeism among nursing staff specifically sickness absence. This is concerning since prevalence rates for mental illness have increased across the health care sector.[50] Moreover, poor mental health was also found to jeopardize nurses' ability to care for patients. For instance, in their systematic review, Gartner and colleagues (2010) determined that poor mental health was positively associated with higher rates of medication errors and lower rates of patient safety.[51] Thus, employers and policymakers must consider the compounding effects that poor mental health may cause.

There are some issues that require further consideration when examining the effects of mental health on sickness absence in this study. Firstly, "mental health" was used as an all-encompassing term for several psychological and emotional conditions, and it is unclear from the study what type of issues was most problematic in terms of absenteeism. From a practical standpoint, it would be an onerous and costly effort to screen for a wide range of mental illnesses in the workplace. Furthermore, while some researchers examined mental health concerns using psychometrically-validated tools, others inferred concerns using simple "yes" or "no" surveys that were constructed by the researchers for their undertaking. Thus, a degree of caution needs to be taken when considering these results. Nevertheless, the literature on the impact of mental health on sickness absence among nursing staff is growing.[11,34,45,50,52-55] Accordingly, employers are encouraged to communicate more effectively with their teams about their well-being and how they are managing their assigned cases to prevent chronic mental health factors and associated sick leaves. Indeed, effective communication was found to be a vital element of leadership, which in turn was found to reduce absenteeism among nurses and improve their commitment to the workplace.[51,56-59]

HCAs were found to have greater odds of sickness absence than nurses, which is consistent with Canadian data.[7] Although both positions are commonly pooled together in research, some elements of their job duties are quite dissimilar. Typically, HCAs have less educational training than nurses, which prevents them from undertaking various medical procedures that registered nurses might assume. They are also paid less. HCAs often support patients with activities of daily living including mobilization, feeding and cleaning. There may be unique physical and emotional risks with such work. Physically,

patient handling can lead HCAs to suddenly move or lift from awkward positions, which in turn leads to musculoskeletal injuries.[35] Also, there is greater risk of physical abuse as a result of patient behaviours for HCAs since they provide essential care to patients who often cannot complete self-care autonomously.

Eriksen, Tambs, and Knardahl (2006) determined that emotionally, HCAs are exposed to high levels of threats and violence that lead to psychological distress including depression.[61] In another study examining nurses and HCAs working in teaching hospitals in France, the authors discovered that HCAs had higher rates of depression than nurses.[62] Thus, these findings may suggest that not only do HCAs have greater odds of sickness absence than nurses due to role differences, but they may also be at greater risk of sickness absence due to poor mental health. To this end, it is believed that HCAs are more likely to experience job strain (i.e., high job demand – low job control),[63] and suffer from an effort-reward imbalance,[12,64] two constructs that are deeply rooted within the occupational psychology field and have shown to be predictive of several health outcomes.

Working night shifts was found to significantly increase the odds of sickness absence. This finding was reasonably expected due to sufficient evidence in the literature suggesting an association between various health hazards and night shifts. In context, it is commonly known that shift work causes disruptions to the body's "internal clock."[63] As such, immunity becomes weaker and cognitive functioning is suboptimal, leading to higher rates of self and patient injuries such as needle stick injuries.[63-67] Night shift is also associated with potentially life-threatening illnesses. Specifically, working night shift was found to increase the likelihood of various cancers such as breast, endometrial,

and colorectal cancer.[68-70] Breast cancer was particularly higher in women, which is a concern in the nursing population due to the disproportion in hires between men and women. The odds of endometrial cancer were also higher if nurses were obese, and night shift nursing staff have higher odds of weight gain.[71,72]

Various occupational settings were investigated concerning their risk of sickness absence. Surgical units and outpatient settings were not found to increase the odds of sickness absence, while pediatric and psychiatric units had statistically significant odds of time loss. In part, this could be because operating rooms are likely more structured in nature. Specifically, there is less ambiguity in the role of the nurse during surgery, as they may follow instructions and adhere to policies and procedures in a more rigorous manner. Furthermore, unlike paediatric and psychiatric units, patients are typically sedated and therefore less likely to act out aggressively. For outpatient settings, they are typically less urgent or critical, and thus, patient behaviour could be more predictable. Also, unlike hospital units, outpatient settings are typically limited to daytime hours and thus, nurses and HCAs have consistent shifts that do not typically rotate or require working overnight.

The impact of both physical and emotional fatigue was examined in this study, and results were statistically significant. Of the four studies pooled in this analysis, three examined physical exhaustion, while one examined emotional exhaustion. Results remained statistically significant, even when emotional exhaustion was precluded, suggesting that any form of fatigue, whether physical or emotional, is an important consideration within the nursing profession. Only one study was found that examined the role of emotional exhaustion on sickness absence in this study. However, emotional

exhaustion, which is one of three key elements of Maslach's burnout theory[75] is likely to be a strong predictor of sickness absence. While we did not have sufficient data to offer a firm conclusion from a meta-analytic standpoint on emotional exhaustion, the authors from the corresponding study revealed that nursing employees who suffer from emotional exhaustion are 2.34 times more likely to experience sickness absence.[36]

Job strain, which is defined by Karasek (1979) as a result of high occupational demand coupled with low decision latitude,[63] was not found to be a strong predictor of sickness absence and had moderately heterogeneous. With this in mind, our results revealed that high demand independently was predictive of sickness absence. Interestingly, having high control did not decrease the odds of sickness absence. This finding is important for employers to consider with matters such as caseloads and administrative duties in efforts to reduce the demand on the nursing staff, which would then reduce the odds of time loss from work.

In this study, increased job satisfaction was not predictive of decreased sickness absence and was also moderately heterogeneous. However, there is evidence suggesting that job dissatisfaction increased the odds of a nurse's intention to leave the workplace due to poor workplace environment as well as poor physical and mental health. Hence, while our results did not detect a significant association, we believe job satisfaction is an important variable to consider for employers given the ongoing challenges reported with respect to retention rates and shortage of nursing staff.[4]

Perhaps one of the clearest predictors in this study was the presence of a supportive work environment, a variable that would seem to foster better work conditions and reduce sickness absence. It is also a strong correlate of mental health. A Japanese

study identified that lack of support in the workplace was one of best predictors of mental health concerns.[79] Recognizing that our results found mental health as a predictor of sickness absence, it is possible that sickness absence is an outcome of poor mental health as a result of a perceived substandard supportive environment. A supportive work environment was also found to indirectly improve patient safety.[80] Specifically, the authors noted that poor organizational climate in conjunction with a high workload increased the odds two-fold of needle stick injury.[64]

### 3.4.2 Limitations and Future Research

Despite the breadth of this study, key limitations must be considered. Firstly, from a methodological context, meta-analytic studies are receptive to publication and search biases. Several efforts were made to minimize this risk including the use of broad searches and investigating unpublished research. Nevertheless, it often viewed as an inherent limitation due to the study's design. Furthermore, while the random-effects model is the appropriate method to carry out this analysis, it is subject to more error with limited studies pooled into the analysis.[13,31] With fewer studies pooled into the analysis, it weakens the estimate of variance between studies. To remedy the risk of poor precision, a minimum of three studies was pooled for the analysis (instead of minimum of two).

A common statistical risk when conducting multiple analyses is Type I error (i.e., false positive). This problem might also occur when conducting subgroup analyses for meta-analytic computations. However, there is no consensus on how to mitigate this issue in meta-analyses. To this end, results were considered through both the commonly used criterion of statistical significance (i.e., $\alpha = 0.05$) and through a stricter criterion to

meet level of significance (i.e., $\alpha = 0.01$).[13] Of the predictors that were deemed statistically significant in this study, three did not reach statistical significance at the 0.01 level. These variables were the two mental health analyses and the increased job demand. Nevertheless, it is important for researchers and policymakers to consider the clinical and practical implications of these findings more so than the criterion used to determine statistical significance.

In terms of study design, all observational studies were considered for this undertaking, including cross-sectional studies, which represented approximately 40% of the studies pooled for the analysis. The biggest disadvantage is determining a causal-relationship as the researcher collects data at one specific time or often referred to as a "snapshot."[81] Thus, it is unknown if the identified risk factors were present before and/or after the health outcome, which impacts the power of "predicting." However, given that cohort studies are often time- and cost-intensive, and experimental designs are impractical or unethical when using these variables, cross-sectional studies were included with other observational studies.

Recognizing the elevated risk that nursing presents, it is recommended that additional observational studies should be undertaken to better understand additional predictors of sickness absence. This is especially important considering that labour laws, scopes of practice and specific work duties are rapidly changing in the health care sector. Next, it is understood that each organization, whether a hospital or a community-based facility operationalizes sickness absence and its duration differently. However, uniting definitions and durations for research purposes could be favourable in efforts to replicate findings. Lastly, while examining studies collectively to quantify the likelihood of

sickness absence was found to be possible and informative, it is important for qualitative efforts to also address some of the gaps in research. Communicating effectively with employers, nurses, and HCAs about their experiences could further deepen our understanding of the risks they face as well as mediating factors that could interconnect and produce unfavourable outcomes.

Concerning the population of interest, we recognize that the nurses and HCAs pooled from different studies assume different roles and settings and have various characteristics that could impact the findings in this analysis. Also, policies and procedures with respect to duties and responsibilities, including the operationalization of nursing positions, are likely to vary greatly between regions and countries. Moreover, this study examined the effect of one independent variable irrespective of other mediating factors that contribute to the outcome of interest (i.e., sickness absence). As a further limitation, sickness absence experienced by personnel on an individual level may vary from person to person, as it is implicit that sickness absence is assumed to be the outcome of a multifactorial etiology.[14]

**3.5 Conclusion**

In conclusion, both nurses and HCAs are important members of the health care system. Their work exposes them to unique risks, some physical and others psychosocial, which could result in lost time from work. Our findings revealed that compromised mental health increases the odds of sickness absence among nurses and HCAs. From an organizational perspective, HCAs were found to be at greater risk of experiencing sickness absence than registered nurses. The results demonstrated that working night shift, as well as working in pediatric or psychiatric units were also

predictive of lost time. Nurses experiencing high demand, irrespective of decision latitude, were found to have greater odds of sickness absence. Importantly, working in a supportive environment decreases the odds of experiencing sickness absence.

## References


1. Garrosa E, Rainho C, Moreno-Jiménez B, Monteiro MJ. The relationship between job stressors, hardy personality, coping resources and burnout in a sample of nurses: a correlational study at two time points. *Int J Nurs Stud.* 2010;47(2):205-215. doi:10.1016/j.ijnurstu.2009.05.014.

2. Garrosa E, Moreno-Jiménez B, Liang Y, González JL. The relationship between socio-demographic variables, job stressors, burnout, and hardy personality in nurses: an exploratory study. *Int J Nurs Stud.* 2008;45(3):418-427. doi:10.1016/j.ijnurstu.2006.09.003.

3. Roelen CAM, Magery N, van Rhenen W, et al. Low job satisfaction does not identify nurses at risk of future sickness absence: results from a Norwegian cohort study. *Int J Nurs Stud.* 2013;50(3):366-373. doi:10.1016/j.ijnurstu. 2012.09.012.

4. Toh SG, Ang E, Devi MK. Systematic review on the relationship between the nursing shortage and job satisfaction, stress and burnout levels among nurses in oncology/haematology settings. *Int J Evid Based Healthc.* 2012;10(2):126-141. doi:10.1111/j.1744-1609.2012.00271.x.

5. Farquharson B, Allan J, Johnston D, Johnston M, Choudhary C, Jones M. Stress amongst nurses working in a health care telephone-advice service: relationship with job satisfaction, intention to leave, sickness absence, and performance. *J Adv Nurs.* 2012;68(7):1624-1635. doi:10.1111/j.1365-2648.2012.06006.x.

6. Toren O, Zelker R, Lipschuetz M, Riba S, Reicher S, Nirel N. Turnover of registered nurses in Israel: characteristics and predictors. *Health Policy*. 2012;105(2-3):203-213. doi:10.1016/j.healthpol.2012.03.002.

7. Dabboussy M, Uppal S. Work absences in 2011. *Statistics Canada Catalogue no. 75-001-X Perspectives on Labour and Income*. Ottawa, ON: *Statistics Canada*; March 2012:1-11.

8. Bureau of Labor Statistics. Absences from work of employed full-time wage and salary workers by occupation and Industry. United States Department of Labor. Retrieved from: https://www.bls.gov/cps/cpsaat47.htm.

9. National Health Services (UK). Sickness absence rates. Retrieved from http://www.digital. nhs.uk/catalogue/PUB21491.

10. Davey MM, Cummings G, Newburn Cook CV, Lo EA. Predictors of nurse absenteeism in hospitals: a systematic review. *J Nurs Manag.* 2009;17(3):312-330. doi:10.1111/j.1365-2834.2008.00958.x.

11. Ferreira Ferreira RC, Griep RH, Fonseca M. A multifactorial approach to sickness absenteeism among nursing staff. *Rev Saúde Publica*. 2012;4692):259-268

12. Schreuder JAH, Roelen CAM, Koopmans PC, Moen BE, Groothoff JW. Effort–reward imbalance is associated with the frequency of sickness absence among female hospital nurses: a cross-sectional study. *Int J Nurs Stud.* 2010;47(5):569-576. doi:10.1016/j.ijnurstu.2009.10.002.

13. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. *Introduction to Meta-Analysis*. Chichester, UK: John Wiley & Sons ; 2009:1-2. doi:10.1002/97804707 43386.

14. Duijts SFA, Kant I, Swaen GMH, van den Brandt PA, Zeegers MPA. A meta-analysis of observational studies identifies predictors of sickness absence. *J Clin Epidemiol*. 2007;60(11):1105-1115. doi:10.1016/j.jclinepi.2007.04.008.

15. Gohar B, Larivière M., Lightfoot, N, Larivière, C, Wenghofer, E. An examination of the factors associated with sickness absence in nurses and nurses' aides. PROSPERO: International prospective register of systematic reviews. 2017. CRD42017071040.

16. Higgins J, Green S. *Cochrane Handbook for Systematic Reviews of Intervetions (Version 5,1).* The Cochrane Collaboration, 2011. Retrieved from http://www.cochran e.org

17. O'Brien-Pallas L, Murphy GT, White S, Hayes L. Building the Future: An integrated strategy for nursing human resources in Canada. *Research Synthesis Report*; 2005.

18. Canadian Federation of Nurses Unions. [Website] Ret.from: https://nursesunions.ca

19. Canadian Nurses Association. *2010 Workforce Profile*. Ottawa, ON: Canadian Nurses Association;November 2012:1-18.

20. College of Nurses of Ontario. *Practice Standard: Nurse Practitioner*. 2018:1-16.

21. Carryer J, Gardner G, Dunn S, Gardner A. The core role of the nurse practitioner: practice, professionalism and clinical leadership. *J Clin Nurs*. 2007;16(10):1818-1825. doi:10.1111/j.1365-2702.2007.01823.x.

22. National Health Institute. National Health's Quality Assessment Tools for Observational Cohort and Cross-sectional Studies. Retrieved from: https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools.

23. Elm Von E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ*. 2007;335:806. doi: /10.1136/bmj.39335.541782.AD

24. Whitaker SC. The management of sickness absence. *Occup Med*. 2001;58(6):420-424.

25. Bourbonnais R, Vinet A, Vezina M, Gingras S. Certified sick leave as a non-specific morbidity indicator: a case-referent study among nurses. *Br J Ind Med*. 1992;49(10): 673-678.

26. Roelen CAM, Schreuder JAH, Koopmans PC, Moen BE, Groothoff JW. Sickness absence frequency among women working in hospital care. *Occup Med.*. 2009;59(7):502-505. doi:10.1093/occmed/kqp089.

27. Pompeii LA, Lipscomb HJ, Schoenfisch AL, Dement JM. Musculoskeletal injuries resulting from patient handling tasks among hospital workers. *Am J Ind Med.*

2009;52(7):571-578. doi:10.1002/ajim.20704.

28. Smedley J, Egger P, Cooper C, Coggon D. Prospective cohort study of predictors of incident low back pain in nurses. *BMJ*. 1997;314(7089):1225-1225. doi:10.1136/bmj.314.7089.1225.

29. Viera AJ. Odds ratios and risk ratios: What's the difference and why does it matter? *South Med J*. 2008;101(7):730-734. doi:10.1097/smj.0b013e31817a7ee4.

30. Borenstein M, Hedges L, Higgins J, Rothstein H. *Comprehensive Meta-Analysis Version 3*. Engelwood, NJ , Biostat; 2016.

31. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. A basic introduction to fixed-effect and random-effects models for meta-analysis. *Res Synth Methods*. 2010;1(2):97-111. doi:10.1002/jrsm.12.

32. Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ*. 2003;327(7414):557-560. doi:10.1136/bmj.327.7414.557

33. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. 2009;6(7):1-6.

34. Horneij EL, Jensen IB, Holmström EB, Ekdahl C. Sick leave among home-care personnel: a longitudinal study of risk factors. *BMC Musculoskelet Disord*. 2004;5(1):9. doi:10.1186/1471-2474-5-38.

35. Alexopoulos EC, Tanagra D, Detorakis I, et al. Knee and low back complaints in professional hospital nurses: occurrence, chronicity, care seeking and absenteeism. *Work*. 2011;38(4):329-335. doi:10.3233/WOR-2011-1136.

36. Bourbonnais R, Mondor M. Job strain and sickness absence among nurses in the province of Quebec. *Am J Ind Med*. 2001;39(2):194-202. doi:10.1002/1097-0274(200102)39:2%3C194::AID-AJIM1006%3E3.0.CO;2-K/abstract.

37. Bourbonnais R, Vinet A, Meyer F, Goldberg M. Certified sick leave and work load. A case referent study among nurses. *J Occup Med*. 1992;34(1):69-74.

38. de Castro, AB, Fujishiro K, Rue T, Tagalog EA, Samaco Paquiz L, Gee GC. Associations between work schedule characteristics and occupational injury and illness. *Int Nurs Rev.* 2010;57(2):188-194.

39. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence: a three month prospective study of nurses' aides. *Occup Environ Med*. 2003;60(4):271–278. doi:10.1136/oem.60.4.271.

40. Eriksen W. Work factors as predictors of intense or disabling low back pain; a prospective study of nurses' aides. *Occup Med*. 2004;61(5):398-404. doi:10.1136/oem.2003.008482.

41. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence: a three month prospective study of nurses' aides. *Occup Environ Med* 2003;60(4):271-278. http://oem.bmj.com/content/60/4/271.short.

42. Feng C-K, Chen M-L, Mao I-F. Prevalence of and risk factors for different measures of low back pain among female nursing aides in Taiwanese nursing homes. *BMC Muscoloskelet Disord*. 2007;8(1):52. doi:10.1186/1471-2474-8-52

43. Gorman JM. Gender differences in depression and response to psychotropic medication. *Gend Med.* 2012;3:93-109.

44. Nilsson A, Lindberg P, Denison E. Predicting of pain, disability, and sick leave regarding a non-clinical sample among Swedish nurses. *Scand J Pain.* 2010;1(3):160-166. doi:10.1016/j.sjpain.2010.05.029.

45. Pompeii LA, Lipscomb HJ, Dement JM. Predictors of lost time from work among nursing personnel who sought treatment for back pain. *Work*. 2010;37(3):285-295. doi:10.3233/WOR-2010-1080.

46. Reis RJ, La Rocca PF, Silveira AM. Factors related to sickness absenteeism among

nursing personnel. *Revista Saúde Pública*. 2003;37(5).

47. Rodriguez-Acosta RL, Richardson DB, Lipscomb HJ, et al. Occupational injuries among aides and nurses in acute care. *Am J Ind Med.* 2009;52(12):953-964. doi:10.1002/ajim.20762.

48. Trybou J, Germonpre S, Janssens H, et al. Job-related stress and sickness absence among Belgian nurses: a prospective study. *J Nurs Scholarsh.* 2014;46(4):292-301. doi:10.1111/jnu.12075.

49. Verhaeghe R, Mak R, Maele GV, Kornitzer M, Backer GD. Job stress among middle-aged health care workers and its relation to sickness absence. *Stress Health*. 2003;19(5):265-274. doi:10.1002/smi.985.

50. Letvak S, Ruhm CJ, McCoy T. Depression in hospital-employed nurses. *Clin Nurse Spec.* 2012;26(3):177-182. doi:10.1097/Nur.0b013e3182503ef0.

51. Gärtner FR, Nieuwenhuijsen K, van Dijk FJH, Sluiter JK. The impact of common mental disorders on the work functioning of nurses and allied health professionals: a systematic review. *Int J Nurs Stud.* 2010;47(8):1047-1061. doi:10.1016/j.ijnurstu.2010.03.013.

52. Franche R-L, Murray E, Ibrahim S, et al. Examining the impact of worker and workplace factors on prolonged work absences among Canadian nurses. *J Occup Environ Med.* 2011;53(8):919-927.doi:10.1097 /JOM.0b013e3182255dea.

53. Roelen CAM, Bültmann U, Groothoff J, et al. Physical and mental fatigue as predictors of sickness absence among Norwegian nurses. *Res Nurs Health*. 2013;36(5):4530-465. doi:10.1002/nur.21558.

54. Rajbhandary S, Basu K. Working conditions of nurses and absenteeism: Is there a relationship? An empirical analysis using National Survey of the Work and Health of Nurses. *Health Policy*. 2010;97(2-3):152-159. doi:10.1016/j.healthpol.2010.04.010.

55. Bourbonnais R, Comeau M, Vézina M, Dion G. Job strain, psychological distress,

and burnout in nurses. *Am J Ind Med.* 1998;34(1):20-28.

56. Pearson A, Laschinger H, Porritt K, Jordan Z, Tucker D, Long L. Comprehensive systematic review of evidence on developing and sustaining nursing leadership that fosters a healthy work environment in health care. *Int J Evid Base Healthc* 2007;5(2):208-253. doi:10.1111/j.1479-6988.2007.00065.x.

57. Schreuder JA, Roelen CA, van Zweeden NF, Jongsma D. Leadership effectiveness and recorded sickness absence among nursing staff: a cross-sectional pilot study. *J Nurs Manag*. 2011;19(5)585-95 doi:10.1111/j.1365-2834.2010.01198.x.

58. Schreuder JA, Roelen CA, van Zweeden NF, Jongsma D Leadership styles of nurse managers and registered sickness absence among their nursing staff. *Health Care Manage Rev.* 2011;36(1):58-66. doi:10.1097/HMR.0b013e3181edd96b.

59. Cullen CB, Gordon PA. The relationship between leadership and communication skills of nurse managers and the organizational citizenship behaviors of medical surgical nurses and nursing assistants. *MOS*. 2014;1(2):1-7. doi:10.5430/mos.v1n2p23.

60. Miranda H, Punnett L, Gore R, Boyer J. Violence at the workplace increases the risk of musculoskeletal pain among nursing home workers. *Occup Med*. 2011;68(1):52-57. doi:10.1136/oem.2009.051474.

61. Eriksen W, Tambs K, Knardahl S. Work factors and psychological distress in nurses' aides: a prospective cohort study. *BMC Public Health*. 2006;6(1):290-511. doi: 10.1186/1471-2458-6-290.

62. Jolivet A, Caroly S, Ehlinger V, et al. Linking hospital workers' organisational work environment to depressive symptoms: A mediating effect of effort–reward imbalance? The ORSOSA study. *Soc Sci Med.* 2010;71(3):534-540. doi:10.1016/j.socscimed.2010.04.003.

63. Karasek RA. Job demands, job decision latitude, and mental strain: implications for job redesign. *Admin Sci Q*. 1979;24(2):285. doi:10.2307 /2392498.

64. Siegrist J. Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol.* 1996;1(1):27.

65. Berger AM, Hobbs BB. Impact of shift work on the health and safety of nurses and patients. *Clin J Oncol Nurs.* 2007;10(4):465-471. doi:10.1188 /06.CJON.465-471.

66. Stimpfel AW, Brewer CS, Kovner CT. Scheduling and shift work characteristics associated with risk for occupational injury in newly licensed registered nurses: an observational study. *Int J Nurs Stud.* 2015;52(11):1686-1693. doi:10.1016/j.ijnurstu.2015.06.011.

67. Geiger-Brown J, Rogers VE, Trinkoff AM, Kane RL, Bausell RB, Scharf SM. Sleep, sleepiness, fatigue, and performance of 12-hour-shift nurses. *Chronobiol Int*. 2012;29(2):211-219. doi:10.3109/07420528.2011.645752.

68. Gershon RRM, Pearson JM, Sherman MF, Samar SM, Canton AN, Stone PW. The prevalence and risk factors for percutaneous injuries in registered nurses in the home health care sector. *Am J Infect Control*. 2009;37(7):525-533. doi: 10.1016/j.ajic.2008. 10.022.

69. Trinkoff AM, Le R, Geiger-Brown J, Lipscomb J. Work schedule, needle use, and needlestick injuries among registered nurses. *Infect Control Hosp Epidemiol.* 2007;28(2):156-164. doi:10.1086/510785.

70. Viswanathan AN, Hankinson SE, Schernhammer ES. Night shift work and the risk of endometrial cancer. *Cancer Res.* 2007;67(21):10618-10622. doi:10.1158 /0008-5472.CAN-07-2485.

71. Kamdar BB, Tergas AI, Mateen FJ, Bhayani NH, Oh J. Night-shift work and risk of breast cancer: a systematic review and meta-analysis. *Breast Cancer Res Treat.* 2013;138(1):291-301. doi:10.1007/s10549-013-2433-1.

72. Schernhammer ES, Laden F, Speizer FE, et al. Night-shift work and risk of colorectal cancer in the Nurses' Health Study. *J Natl Cancer Inst.* 2003;95(11):825-828. doi:10.1093/jnci/95.11.825.

73. Jordan G, Nowrouzi-Kia B, Gohar B, Nowrouzi B. Lost-time illness, injury and disability and its relationship with obesity in the workplace: a comprehensive literature review. *Saf Health Work.* 2016;29(5):749-766. doi:10.1016/ j.shaw.2014.12.006.

74. Siqueria K, Griep R, Rotenberg L, Silva-Costa A, Mendes da Fonseca M de J. Weight gain and body mass index following change from daytime to night shift – a panel study with nursing professionals. *Chronobiol Int*. 2016;33(6):776-779. doi:10.3109/ 07420528.2016.1167719.

75. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol.* 2001;52(1):397-422. doi:10.1146/annurev.psych.52.1.397.

76. Sourdif J. Predictors of nurses' intent to stay at work in a university health center. *Nurs Health Sci*. 2004;6(1):59-68.

77. Hussami Al M, Darawad M, Saleh A, Hayajneh FA. Predicting nurses' turnover intentions by demographic characteristics, perception of health, quality of work attitudes. *Int J Nurs Pract*. 2014;20(1):79-88.

78. Cohen A, Golan R. Predicting absenteeism and turnover intentions by past absenteeism and work attitudes: an empirical examination of female employees in long term nursing care facilities. *Career Dev Int*. 2007; 12(5):416-432.

79. Lambert VA, Lambert CE, Ito M. Workplace stressors, ways of coping and demographic characteristics as predictors of physical and mental health of Japanese hospital nurses. *Int J Nurs Stud.*2004;41(1):85-97. doi:10. 1016/s0020-7489(03)00080-4.

80. Neal A, Griffin MA, Hart PM. The impact of organizational climate on safety climate and individual behavior. *Safety Sci.* 2000;34(1-3):99-109.

81. Carlson MDA, Morrison RS. Study design, precision, and validity in observational studies. *J Palliat Med.* 2009;12(1):77-82. doi:10.1089/jpm.2008.9690.

# CHAPTER 4:

## Understanding Sickness Absence in the Nursing Profession: Insights from Key Informants, Nurses, and Personal Support Workers in Northeastern Ontario

Basem GOHAR,[1] Michel LARIVIÈRE,[2] Nancy LIGHTFOOT,[3] Elizabeth WENGHOFER,[4] Céline LARIVIÈRE.[5]

1 PhD Program in Interdisciplinary Rural and Northern Health, Laurentian University, Sudbury, ON, Canada.

2 School of Human Kinetics, Northern Ontario School of Medicine, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

3 School of Rural and Northern Health, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

4 School of Rural and Northern Health, Laurentian University, Sudbury, ON, Canada.

5 School of Human Kinetics, Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON, Canada.

Corresponding author: Basem Gohar, 935 Ramsey Lake Road. Laurentian University,

Sudbury, ON, Canada

Acknowledgment: I would like to thank Mr. Justin Desroches for his role in transcribing audio recordings to text.

**ABSTRACT:**

**Background:** The nursing profession is considered a stressful occupation with physical and psychosocial stressors that are inherent in its practice. Notable rates of sickness-related absence have been reported in Canada and worldwide. Within the health employment sector, over 50% are nurses and personal support workers (PSWs). This is of much concern in northeastern Ontario where health care is its largest employment sector. Some quantitative studies highlighted variables associated with sickness absence. However, we found some of the results to be conflicting. Furthermore, the results could not explain why such factors would eventually lead to experiencing sickness absence. Lastly, we could not find any research that examined sickness absence in relation to nursing staff in northeastern Ontario. **Aim:** This study sought to identify and understand the factors associated with sickness absence among nurses and PSWs through the experiences of nursing staff and key informants working directly with this population, with additional considerations for northern-specific factors.

**Method:** Qualitative methods were used to gain a deeper understanding of the factors associated with sickness absenteeism. Four focus group sessions took place for this undertaking, one with each of the following groups: registered nurses (RNs; n= 6), registered practical nurses (RPNs; n= 4), PSWs (n= 5), and key informants who specialize in occupational health and safety, and nursing unions (n= 5). Nursing personnel had a minimum of five years of health care experience and were recruited from hospitals and long-term care facilities within the City of Greater Sudbury, Ontario. Key informants consisted of union representatives for RNs, RPNs, and PSWs, disability management staff from a local hospital, and a rehab specialist from a private insurance

company. Focus group sessions were transcribed and then analyzed using thematic analysis. **Findings:** Overall, four main themes emerged from this study: challenges emerging from the organization, the impact of the job on one's physical health, psychological/mental health factors consequential to job role, and factors described as unique to northern (northeastern) regions. Organizational factors included exposure to infectious diseases, shift work, safety climate, and work setting. Physical health factors mainly focused on musculoskeletal disorders. Psychological/mental health factors included experiencing guilt, anxiety, and burnout. Northern-specific factors included driving in poor road and weather conditions, especially for PSW providing home-care services, and the limited opportunity of interconnected health care networks where employers could supplement their staff in the event of staff shortage. Descriptions of why such factors may lead to sickness absence were also addressed in this study. **Conclusion:** Our results suggest that sickness absence is quite complex and that the aforementioned themes are typically quite intertwined with staff shortage as one of many important underlying factors.

## 4.1 Introduction

The nursing profession is considered to be a stressful occupation with physical and psychosocial stressors that are seen as inherent to its practice.[1,2] Nurses and Personal Support Workers (PSWs) have the highest injury rates and sickness absence rates in Canada.[3] This finding is concerning for areas such as the City of Greater Sudbury, located in northeastern Ontario, where health care is one of its largest employers.[4]

An exploration of quantitative literature identifies a number of correlates for sickness absence. While these variables offer some understanding of how a nursing staff might be at risk of sickness absence, their magnitude and mechanisms are largely unknown.[5] The purpose of this paper is to identify and further understand the factors related to sickness absence among nurses and PSWs through the experiences of nursing staff and key informants working directly with these health care professionals. It will also consider northern-specific factors.

## 4.2 Literature Review

### 4.2.1 Background

Nursing staff, including PSWs, were found to be a vulnerable population with various risk factors that impact their physical and emotional well-being as well as increase sickness absence.[1,2,6] Despite the improvement of employees' overall health and safety in recent years, sickness absence remains problematic in the health care sector, especially among nursing staff. While it has been reported that absenteeism in this population is still misunderstood,[5] some studies have quantified the relationship between various factors and sickness absence.[7] Factors as reported in the literature can be

grouped under demographic, lifestyle, physical health, mental health, and organizational factors.

### 4.2.2 Demographic Factors

The majority of the observational studies examined in the literature determined that nursing staff who are older than the ages between 45 and 50, are more likely to experience higher sickness absence than younger staff.[8-10] In contrast, a Nordic study conducted by Elstad and Vabø (2008) determined that nursing staff who were 51 years or older had significantly lower odds of sickness absence.[11] Moreover, in a cohort study examining the link between sickness absence and low back pain in nurses, the authors did not find a significant relationship between the two variables.[12] It is unknown why such contradictions existed in the literature. However, they may exist for a number of reasons such as the difference in organizational cultures, including leadership style, health promotion, and disease prevention initiatives.

### 4.2.3 Lifestyle Factors

Physical activity as a predictor of sickness absence in nurses and PSWs was examined in various observational studies.[13-16] The findings in all studies allude to a negative relationship between increased physical activity and sickness absence. However, only two studies were statistically significant.[14,16] This could be a result of how each author quantified physical activity through the type of activity, its frequency, intensity, and duration. For instance, Ferreira et al. (2012) did not specify the type or frequency of physical activity, but rather, examined the duration of physical activity on a weekly basis.[13] Difficulty sleeping was another lifestyle factor examined in the extant literature. For example, a Danish cross-sectional study examined sleep problems and its

relationship with sickness absence among elderly PSWs.[17] The researchers revealed that sleeping problems significantly increased the odds of both moderate sickness absence (6-20 days) and high sickness absence (21 + days). Ferreira et al. (2012) also found a significant correlation between the two variables.[13] However, in two other studies, no significant relationships were found.[15,18]

### 4.2.4 Physical Health Factors

One's perception of their own health was found to be a significant contributor to sickness absence.[8,10,13,16,18,19] Specifically, those who rated their overall health as poor were more likely to experience sickness absence than those who perceived their health as good. Similarly, history of sick leave also appeared to be a strong predictor of future sick leaves.[20,21] For example, a Swedish longitudinal study examined risk factors related to sick leave in home-care personnel.[21] Using two different study groups following an 18-month follow-up, results revealed that both previous sick leave due to musculoskeletal pain and previous sick leave that was not due to musculoskeletal pain were significantly predictive of future sick leave.

Musculoskeletal pain–whether neck, shoulder, back, or lower back pain– was examined in seven different observational studies.[10,12,13,16,21,23] All studies revealed high odds of sickness absence if musculoskeletal pain is present. The odds were shown to be greater if the pain was located in the lower back region, with odds ratios (OR) as high as 7.3 (CI: 3.5-15.2).[12] While there were no inconsistencies in the literature concerning the impact of physical health factors on nursing staff, understanding how such factors develop and lead to sickness absence remain unclear.

### 4.2.5 Mental Health Factors

Overall, there were seven studies that examined the impact of mental health on sickness absence.[13,20,21,24,27] Our literature review of quantitative studies revealed that poor mental health is a fairly cogent predictor of absenteeism among nursing staff specifically sickness absence. Results from a Brazilian study revealed that nurses and PSWs who suffer from mental health concerns such as anxiety or depression had twice the odds of experiencing long-term sickness absence (8+ days).[13] This is concerning since prevalence rates for mental illness have increased across the health care sector.[28] Moreover, poor mental health was also found to jeopardize nurses' ability to care for patients. For instance, it was reported that poor mental health was positively associated with higher rates of medication errors and lower rates of patient safety.[29] Similar to the findings pertaining to physical health, the identified studies could not help in ascertaining how one's mental health can be affected in the workplace leading to sick leave.

#### 4.2.6 Organizational Factors

Three organizational factors were addressed in the literature: (1) profession (Nurse vs. PSWs), (2) working night shift, and (3) unit placement (i.e., outpatient, paediatrics, surgery, and psychiatry). Of the four studies that examined the difference between nurses and PSWs,[13,20,30] only one study was statistically significant, suggesting that PSWs are at greater risk of sickness absence than nursing staff.[31] Working night shift was examined in five different studies.[10,13,32,34] Overall, night shift increased the odds of sickness absence, although two of the studies were not statistically significant.[13,33] Rotating shift work was also found to affect nurses' physical and mental health vs. those who worked non-rotating (standard) shifts.[35] Various occupational settings were investigated in relation to their risk of sickness absence. Working

outpatient or in surgical units were not found to increase the odds of sickness absence.[15,26,33] In contrast, pediatric (OR= 2.42; CI95%= 1.39-4.21)[10] and psychiatric (OR=4.3; CI95%= 1.3-14.3)[36] units had statistically significant odds of lost time.

There was sufficient statistical information to investigate the impact of work support offered by the employer or co-workers bi-directionally (high support and low/no support). Firstly, an inverse association was found as support increased with lower odds of sickness absence.[21,37,38] Similarly, studies that examined low/no work support found a statistical increase in sickness absence.[8,10,16,24,26]

### 4.2.7 Northeastern Ontario

The culture of northeastern Ontario and its residents also merits consideration. In this area, the City of Greater Sudbury is also the largest urban city in northeastern Ontario. Sudbury is classified as an urban city because its population is over 100,000 with large urban centres.[39] In Sudbury, health care is the largest employment sector and accounts for 15% of the entire workforce, with approximately 6000 health care workers.[4] Over 50% of those health care workers are nurses and PSWs. Given their strong representation in the city's workforce, it would be of benefit to gain their insight regarding the correlates found in the literature and understand their views of sickness absence and potential northern-specific factors.

Overall, research on sickness absenteeism in northeastern Ontario nurses and PSWs is scarce. A study by Nowrouzi et al. (2015) examined work and home-related factors that were linked to work ability in obstetric nurses.[40] The authors determined that work satisfaction and a supportive work environment that allows them to be engaged in decision-making processes would reduce work disability and absenteeism. Carosi and

Lightfoot (2009) conducted a retrospective review to examine factors associated with sickness absence among cancer care workers in the City of Greater Sudbury.[41] Similar to the findings in the literature, female workers were at greater risk of sickness absence than male workers. It was also determined that employees younger than 40 years had higher sickness rates than older staff. Furthermore, those who have been employed for less than five years had significantly lower odds of sickness absence.[41]

**4.3 Aim**

Based on our literature review, we discovered three main gaps. First, there were some notable contradictions between study findings in relation to sickness absence. Second, even with cogent predictors of sickness absence revealed in quantitative research, understanding how such factors develop or why they may lead to sickness absence is unknown due to methodological limitations. Finally, despite their strong presence in the City of Greater Sudbury's labour force, research on nurses and PSWs is scarce, particularly with respect to sickness absence.

This qualitative study had three objectives: (1) to examine the factors related sickness absence among nurses and PSWs; (2) to gain a better understanding of how and why such factors occur; and (3) to determine if there are additional risk factors to keep in mind when considering nurses and PSWs in northeastern Ontario, particularly, in the City of Greater Sudbury.

**4.4 Definitions of Terms**

In this undertaking, sickness absence was defined as an approved time off from the workplace subsequent to an injury or illness.[42] Nurses and PSWs were the two groups of interest in this study. For this study, the term "nurse" includes registered

nurses (RNs) and registered practical nurses (RPNs).[43] PSWs are Canadian workers who assist patients with daily personal care and often work under the direction of an RN or RPN.[44]

Northeastern Ontario was operationalized using the Ministry of Health and Long-term Care's (MOHLTC) demarcations.[45] These geographical separations are based on the 14 Local Health Integration Networks (LHINs) that provide health services in Ontario. The City of Greater Sudbury is located within the northeastern region of Ontario, which represents approximately 4.5% of Ontario's population and nearly 40% of total land area.

## 4.5 Description of the Study

Focus group (FG) discussions were undertaken in Sudbury, Ontario by way of semi-structured interviews. FGs are helpful in exploring different opinions, allowing for interactive discussions based on the experience of participants.[47] To this end, we conducted four different FG discussions, which included RNs, RPNs, PSWs and key informants.

### 4.5.1 Sampling and Setting

For nurse and PSW recruitment, ads for participation were placed in a local hospital and a long-term care facility. Study description, participant eligibility, the author's contact information, and incentive ($20.00 gift card) were indicated in the ad. Individuals who expressed interest in participating were considered based on two factors. First, they had to be employed as either a nurse (RN or RPN) or a PSW. Second, to facilitate richer discussions from their experiences, participants had to have worked a minimum of five years of work experience in their respective role. Participants were

grouped based on their job title (RN, RPN, & PSW) to ensure homogeneity in terms of education and job levels.

Researchers involved in this study held formal discussions in efforts to set criteria for key informants and to identify potential candidates. Unlike the eligibility criteria set for nurses and PSWs, criteria for key informants were less stringent and more heterogeneous. This was to ensure that we gained various point of views on these health care professionals and sickness absence, but with careful geographical considerations. To this end, we determined that key informants had to be individuals who work with or support nursing personnel in northeastern Ontario. As nurse and PSW positions are mostly unionized, we determined that union representation would be helpful. Second, we determined that individuals who work with disability claims and occupational health and safety within a health care facility would be informative. Finally, discussing sickness absence with individuals who provide rehabilitative services to nurses and PSWs as part of their Employee Assistance Program (EAP) was also viewed as a critical element. Invitation letters were sent electronically to each individual identified as a potential key informant. Of the total six sent invitations, five individuals agreed to partake in an FG discussion.

Four independent FG sessions were held for this study. One FG consisted of key informants (n= 5). The other three consisted of nursing employees. Specifically, there was one FG for RNs (n= 6), one for RPNs (n= 4), and one for PSWs (n= 5) for a total of 20 participants. Most participants were females (n= 18) and 60% were from a hospital setting (n= 12). PA table is provided to describe work characteristics of participants in

each group. All FG sessions took place at Laurentian University's Centre for Research in Occupational Health and Safety conference room.

| Focus Group | Sex | Work Type/Unit Placement |
|---|---|---|
| Registered Nurses (RNs) | F= 5; M= 1 | • Pediatrics<br>• Cardiac Care<br>• Critical Care<br>• Acute Care<br>• Mental Health & Addictions |
| Registered Practical Nurses (RPNs) | F= 4 | • Rehab<br>• Children's Treatment Centre<br>• Occupational Health & Safety |
| Personal Support Workers (PSWs) | F= 4; M= 1 | • Long Term Care Facilities |
| Key Informants | F= 5 | • Health & Safety Specialists<br>• Union Representatives<br>• Private Rehabilitation Specialists |

**Table 1**. Characteristics of Participants Involved in Focus Groups

***Ethical Considerations***

This study received ethical approval from the Research Ethics Boards at Laurentian University and Health Sciences North in Sudbury, ON.

### 4.5.2 Procedure

Written informed consent forms were signed prior to FG discussions. In each FG session, a moderator (BG) and a research assistant (JD), were present. Sessions were approximately 90 minutes in duration. Each FG session commenced with a brief introduction, requesting that participants introduce themselves. Ground rules such as confidentiality and respect of participants' responses were also addressed. Each participant was asked to disclose their names each time they spoke, which the research assistant then coded the text during the transcription stage.

A transcript containing a semi-structured interviewing guide was used to generate discussions. There were two primary open-ended questions asked at each focus group meeting. The first question focused on identifying factors that could predict sickness

absence for their respective population (i.e., RN, RPN, PSW). Specifically, this author asked: "Based on your experience, what are some potential risk factors that predict, or are associated with, work-related illness, or disability in (position)?" With the expertise the key informants possess in nurses and PSWs as well as occupational health and safety, they were also asked comment on what they view as risk factors in those populations. The second question sought to identify any risk factors that were "northern" specific, that is, particularly attributable to northeastern Ontario ("In your opinion, are there any potential risk factors that you think are specific to Sudbury and/or northeastern Ontario and why?"). For both questions, the facilitator asked follow-up questions to better understand the participants' answers and gain additional information when applicable.

### 4.5.3 Thematic Analysis

All focus group discussions were audio recorded and transcribed verbatim by the research assistant. Each participant was assigned a code to ensure confidentiality. Subsequently, as a quality assurance method, the moderator reviewed the transcript of each FG session while listening to the recordings. Thematic analysis was used to understand the narrative data. Unlike other qualitative research analyses, thematic analysis is a method of analysis rather than being an approach in guiding qualitative research. It also provides flexibility in analyzing meaning across a whole dataset or in concentrating on one specific area in depth, which compliments this study.

This undertaking applied the six stages recommended by Braun and Clarke (2012) for thematic analysis.[48] First, transcripts were read several times to ensure a sound understanding of each session as a whole as well as an understanding of each participant. They were also read while listening to the audio recording to ensure accuracy and context

while at the same time carefully noticing content that is directly related to this study's research questions. Initial codes were then generated based on the participants' comments as well as their implications as they related to this study. Based on the codes generated from the previous step, they were then aligned with specific themes and converted into meaningful units, which were then coded into themes using NVivo Version 11.[49] The themes were then reviewed in relation to the coded data and then were defined accordingly. Notably, all reported themes had to have been brought forward in all four FG sessions. Lastly, the chosen themes were then formulated in a meaningful manner, allowing readers to understand and follow the results coherently.[48] Upon completion of the aforementioned stages, we completed a final check of the entire process, seeking any contradicting statements or textual data that could be misinterpreted to ensure the study's objectivity (i.e., confirmability).[50]

#### 4.5.4 Methodological Considerations

While thematic analysis is a common qualitative method of analysis with FGs, some methodological considerations need to be addressed such as credibility, transferability, dependability, and confirmability.[50,64,66] Credibility, which is sometimes referred to as the "internal validity" in qualitative research, refers to how congruent the results of this undertaking to "real-life."[50] To this end, a technique, which is referred to as "triangulation," was used.[65] Triangulation refers to the use of multiple sources to obtain results related to the question of interest to ensure that the information is indeed valid. Specific to this undertaking, we sought the literature and approached different populations to discuss learn more about sickness absence. Frontline participants (i.e., nurses and PSWs) were recruited to participate in focus groups to discuss their views on

factors associated with sickness absence. In addition, key informants also participated. By having union representatives, disability managers, and rehabilitation experts, key informants played an important role in this study, which was to speak on the concerns their clients (i.e., frontline staff) express to them. Also, while each job role has different responsibilities, there are many overlapping duties between the three positions investigated and thereby, overlapping concerns were also reported.

Dependability, which is the reliability of this study, was strengthened by our detailed disclosure of methodological procedures including recruitment and analysis. [50] Confirmability, which looks at the objectivity the results, was also carefully considered in this study. Specifically, upon completing data analysis and the reporting of the themes from this study, an additional check was completed to ensure that textual data were not misconstrued. This was done by reviewing the transcripts and seeking any misleading or contradictory statements. Please see the discussion section for more information on confirmability and transferability.

### 4.6 Findings

The analysis of the FG discussions resulted in three major themes with several subthemes (Table 2), and northern-specific factors serving as the fourth theme. The four most significant themes emerging from the FG discussions were: organizational factors, physical health factors, psychological/mental health factors, and northern-specific factors.

| Themes | **Subthemes** |
|---|---|
| 1. Organizational factors that impact the employees | 1. Exposure<br>2. Shift work<br>3. Safety climate/work support<br>4. Work setting |
| 2. The job's impact on one's physical health | 1. Musculoskeletal disorders |
| 3. Psychological/mental health factors consequential to job role | 1. Guilt and burnout<br>2. Anxiety |

| | |
|---|---|
| **4. Additional factors related to sickness absence that could be northern-specific** | 1. Weather and road conditions<br>2. 2Interconnected health care networks |

**Table 2**. Themes and Subthemes Emerged from Focus Groups VIA Thematic Analysis

### 4.6.1 Organizational Factors

Results from the analysis revealed that organizational factors play a significant role in the likelihood of a nurse or a PSW experiencing sickness absence. To this end, we discovered four organizational subthemes: exposure, safety climate and work support, shift work, and work setting.

***Exposure***

Exposure to infectious diseases was reported as a widely common issue. Participants, largely nurses and PSWs, reported that the nursing personnel are frequently exposed to viruses and infections. Participants describe that it is often difficult to protect against contamination:

> *… when flu season's around, we have a lot of isolations and like sometimes we get one nurse, we call the "dirty nurse" and she takes care of all the isolation so we try to minimize the contamination as much as possible. But you know, once one person gets sick and especially in a long-term care home it's like a day care and everybody gets sick and the staff get sick and you know, staff come in sick anyways because they got to make a living. And they just keep spreading and it's very bad for the staff and the patient.*

Participants expressed that while policies are put in place to prevent infectious diseases, they are still challenging to implement and manage. They noted that several precautions are taken to prevent the spread of infectious diseases by employees wearing masks, gloves, and frequently washing their hands during their shifts. However, the patients do not always follow instructions of keeping masks on and washing their hands:

> *We have to gown and mask and do all the proper fit, stuff that needs to be done but because of a patient's rights, the patient is allowed out of the room and they go out without the equipment.*

Furthermore, it was determined that the under-reporting of feeling sick (e.g., the influenza virus), could in fact lead to sickness absence, as working while feeling sick often leads to spreading viruses to other staff members and patients. However, participants noted that staff shortages are frequent and that, as a result of guilt, some nurses and PSWs choose to come to work when sick, recognizing that their absence might have more severe implications for their colleagues. That is, a nursing staff ending his or her shift might be asked to extend their hours or the team would be faced with working short staffed; naturally, this increases the demand on the team:

> *I wasn't feeling well but [if I] go home and just leave them short because I knew nobody's going to come in…. So I felt bad leaving them short. And it was like a Saturday and it was very busy. So I had to stay…*

***Shift Work***

Shift work, whether night shift, rotating shifts, or working overtime, were all considered to be strong factors related to sickness absence for reasons that would be considered as multifactorial. Participants indicated that shift work is a contributor to poorer health and chronic conditions (e.g., diabetes). These issues, including fatigue, reportedly led to serious injuries to staff members at work or leaving work (e.g., while driving home following a shift):

> *Working shift work is a risk factor for nurses. I mean 7 years off your life… you have to take into consideration that amount of stress, you're not at your peak when you're working night shifts, so you know you're putting yourself in jeopardy and you're doing it for patients, of course that they're cared for, but you know it, has an impact on your health from switching back and forth.*

It was indicated that in order to do shift work, the nurse or PSW must and still make time to have adequate sleep, which at times is quite challenging due to personal commitments such as caring for family members. However, participants indicated that

this is often difficult to maintain given the level of fatigue adjusting to rotating shifts or working night shifts. Furthermore, unplanned overtime, when a staff member calls in sick, was found to further exacerbate fatigue levels and associated well-being concerns.

> *We were short and [a nurse] had to stay overnight. We didn't have any RN to cover for the night shift and she was only afternoon shift. [The nurse] had to stay overnight. And she wasn't prepared, she had no lunch, she had nothing.*

Working shift work, particularly night shifts or rotating shifts also causes nursing personnel to find means to adjust their internal clocks or to cope with pains and aches resulting from long hours of work. As such, self-medicating was found to be a frequent "self-care" method by some staff:

> *… They're medicating with things [such as] caffeine. They can go to work and they're drinking 10 cups of coffee a day because that's what keeps them alert…*

> *It's hard to flip the body when you you're supposed to be awake and you're supposed to be sleeping. So, sometimes you have to take a sleep aid to get good sleep. So you can get up for your night shift.*

***Safety Climate and Work Support***

An issue that is reportedly common in the nursing profession is poor safety climate, which is the perceived value of safety within an organization. Participants expressed that this concept is not specific to their current workplace, but it is a widely common issue within the health care profession. Key informants also noted that such issues are seen in other areas of Canada and North America. Unlike other types of work where there is no patient contact, it is difficult for nursing personnel to refuse to work, as they have an obligation to care for their patients. One key informant offered an example by comparing how a miner might choose to refuse work, as per Occupational Health and Safety regulations; however, it becomes more complicated when dealing with human beings, as their health could deteriorate, leading to adverse outcomes. The concern with

this issue is that there appears to be public acceptance that patient violence is part and parcel of the nurses working environment.

> *…Whether you get punched in the face, whether you injure your back, there is a certain expectation from the general population that it's part of your job… I've had police called in when a staff had been assaulted and they said, "Well, it's a part of your job."*
>
> *We're supposed to put up with things because we are nurses and nothing else.*

A closely related issue to the above is the hectic environment within the nursing profession that at times does not provide staff with effective post-incident debriefing. Participants stressed the importance of debriefing given the nature of their work and their inability to share their experiences outside the workplace since they are bound by confidentiality.

> *… [we] do very poorly in debriefing people in the moment. So we have, you know the nurse who's just lost a child. We don't debrief, it's [a] part of the job.*
>
> *You bring it home but you're not allowed to talk about it. I'm not allowed to bring my work home. I'm not allowed to come home and have a conversation about all the stuff that went on because that's a breach of my work.*

***Work Setting***

Work setting was also viewed as a factor that was felt to be highly related to sickness absence. In long-term care facilities nursing staff, particularly PSWs, help patients with self-care tasks. Participants indicated that a large number of the patients they work with are to some degree incapacitated and can be violent:

> *… a lot of patients that we work with have either dementia or delirium and some of them could be aggressive… Personally I did get hit once…. I knew some of my co-workers that got hit pretty [badly] and they had to stop working for about a month.*

Our findings revealed that acute care settings were also deemed as hazardous. Specifically, nurses were found to be at risk of sickness absence due to patient violence if

working in units such as emergency departments and psychiatric units. These hospital units are known to experience unpredictable risks such as intoxicated patients or a psychotic outbreak. Pediatric units were different given the level of emotional strain that is placed on the nurses when fatalities occur. This is further discussed under the Psychological/Mental Health theme:

> *There's a lot of guilt. In children [death] is not supposed to happen… I think for us there's a pretty big component of burnout.*

Participants in the FGs, however, stressed that no matter which acute unit it might be, there is always a risk and it is not always provoked by the patient, but other individuals such as patients' family members:

> *Whether it's the father that's coming in to find out if their son was killed in a car accident, or the wife that just lost a spouse, or the person that has dementia… Any individual should be considered a risk because they're coming into an acute setting or they're coming into a setting where they don't have control of what's going on.*

### 4.6.2. Physical Factors

#### *Musculoskeletal Disorders*

Results from the analysis suggest that nurses and PSWs considered physical health factors, specifically musculoskeletal disorders (MSD), as a large contributor in the occurrence of sickness absence among nurses and PSWs. Data from the FG session indicated several nursing staff members suffer with MSD, whether at a tolerable level or to an extent that requires rehabilitative services and time away from work. A key informant described MSD as "the number one career ender for a nurse." Participants explained that there are several factors that lead to the manifestation of absenteeism due to MSD. First is the age and level of experience of the staff. For instance, participants from the key informant FG noted that MSD is generally attributed to age, especially with

older PSWs, but are new to the field. In addition, history of MSD appears to predict future MSD and sickness absenteeism:

> *… for some PSWs, it's a second or maybe third career. So they're already older when coming into the position and they're new…. There is also the fact that the older you get, the less able you are to heal. So they may have a smaller injury, that's not necessarily at the beginning worthy of note, but [then] it aggravates [and] gets worse over time.*

Repetitive and awkward movements were reported as an antecedent to the development of MSD:

> *I came from a surgical unit and we repeatedly moved patients from a stretcher to a bed and a lot of times, they just had surgery so they don't move well on their own so you're literally pulling them from one bed to the other.*
>
> *For us on rehab, we do a lot of transferring patients to go to their therapy, so we're constantly getting the patient from the bed to the wheelchair and then back to the bed to get dressed after the therapy and so back up in the wheelchair for supper. So we're doing so many transfers during the day just for one patient.*

Insufficient staffing was described as a precursor to experiencing MSD. Specifically, working on a team that is not at full capacity often translates to working faster and harder, which leads to not using the proper form during lifts and transfers. In addition, with irregular and short sleep durations due to shift work, staff members do not have adequate recovery time after experiencing a physical ache or strain:

> *… shift work is hell on the ability to sleep and if you don't sleep you don't heal, if you don't heal, then that MSD injury is much more likely to happen.*

#### 4.6.3 Psychological/Mental Health Factors

Participants from all four groups considered mental health as a factor that could lead to sickness absence. A key informant who is in charge of disability claims noted the significance of mental health and disability claims. Specifically, in the key informant's workplace setting, mental health was reportedly the third most common cause of short-term disability. The informant also predicted that its impact could further surge the rates

of sick leaves. Moreover, results from entire data revealed that mental health is a problem in the workplace as its symptoms are typically variable among nursing staff, and unlike physical factors, they are difficult to envisage. Likewise, it was indicated that psychological issues could manifest in a physical form. Interchangeably, a physical disability could then lead to stress and depression or anxiety, specifically with the preparation to return to work or fear of re-injury. As such, key informants warned that sometimes workplace statistics might not tell the "entire story," as data might not depict a "comprehensive picture" of how the relationship between physical health and mental health develop:

> *Many of the disabilities that people experience as physical, really have their roots in psychological… So we're really only seeing the tip of the iceberg*
>
> *… it starts off as back pain and then turns into a mental health issue. From short-term back pain to long-term depression, anxiety…*

***Guilt and Burnout***

As previously stated, working in a pediatric facility was found to encompass emotional distress and burnout following fatal events such as the death of children. Participants explained that there is a degree of compassion when working children as most nursing staff are parents with children of their own:

> *Like for example us, being in the Children's Treatment Centre, if you don't have children, you may not be as compassionate as someone like me that has a child.*

Discussions with participants alluded to the impression that personality is a contributing factor in experiencing mental health concerns that could be significant enough to result in a sick leave. To this end, they explained that personalities and compassion are often tied together. Some staff can be compassionate, but can detach after a shift ending while others cannot.

***Anxiety***

Limited staffing once again was tied to sick leave. Only this time, the lack of staffing could trigger nursing personnel even when they're off duty, as many reported that they anticipate a call requesting their support due to staff shortage:

> *Maybe anxiety. That would be because [you're] anxious about work. The uncertainty of if you're gonna get called… should I go to bed earlier? …and it just increases and you just stop going to work or you might miss days.*

### 4.6.4 Northern-Specific Factors

Participants commented that overall, the nursing profession is similar, irrespective of setting. Organizational factors such as shift work, developing MSD, and mental health concerns were described as "global issues." However, there were two factors that might be classified as "northern-specific." In comparison to the north, larger urban centres in southern Ontario have interconnected networks. Accordingly, participants noted that nurses' names could be placed on alternate lists of connected hospitals in the event of being short-staffed. This in turn, generates a large list of available nursing staff and thus, lowers the risk of nurses working overtime or consecutive shifts and units being short-staffed.

Some participants suggested that the City of Greater Sudbury is quite large in its landmass, and some staff might be living far from their place of employment. Reportedly, Sudbury's roads were considered to be hazardous, and this hazard becomes more significant during winter conditions. To add to this issue, cellular receptions are often weak in some areas. Participants also noted that PSWs are at greater risk, as they commonly provide home care services to patients. Unlike other services a nursing personnel might offer, assisting patients with every day needs such as feeding or cleaning

are essential, and thus, it was perceived to be more difficult to cancel appointments due to poor weather conditions:

> *We have a friend that does um at-home care and it's like driving far away. Or… you know how Sudbury road conditions are like…*
>
> *… a PSW has to be there because this person won't get the personal daily needs so they really have to be there…*

**4.7 Discussion**

This qualitative study sought to examine the factors of sickness absence as well as their causes and consequences while considering northern-specific factors for areas such as northeastern Ontario for nurses and PSWs. Our results confirm that there are several factors perceived to cause sickness in this population with major themes including organizational, physical, psychological/mental health, and northern-specific. The results were similar to the findings of another Canadian qualitative study that sought to examine the causes of absenteeism in amongst nurses.[50] The authors collected data from 10 Ontario acute care hospitals, where five had high lost-time claim rates and their counterpart had lower claim rates. They conducted focus groups with nurses, chief executive officers (CEO), chief nursing officers (CNO), and occupational health and safety specialists. The main concerns expressed by all group members included: physical health, psychosocial/mental health, scheduling issues, workload, and respect between colleagues and employers.[51] However, this paper did not offer deep explanation as to how the aforementioned factors manifest into sickness absence and did not offer insight with respect to geographical differences (i.e., northern vs. southern Ontario).

Recognizing that identifying factors related to sickness absence has been widely addressed in the literature, this paper highlights why such factors could then turn into

sickness absence. Through a deeper, intricate understanding of how such factors lead to sickness absence, better preventative strategies could be implemented. Furthermore, findings obtained from this paper offers insight on the additional risks involved with nurses and PSWs working in northeastern Ontario.

Perhaps the most important finding from this work is that while these themes are relevant in and of themselves, they are also quite intertwined and mixed with professional, personal and environmental factors. From our findings, we discovered the staff shortage was indeed an underlying factor that posed a great deal of threat on nursing staff. Specifically, working short-staffed adds demand on the employee and increases the risk of not exercising all safety precautions, which could lead to musculoskeletal pain, which is further exacerbated if the employee had history of such complaints. Additionally, working short staffed might lead to employees working longer or irregular shifts, increasing levels of fatigue, and thereby increasing the risk of accidents in the workplace and limiting the resting period after work. Given the negative implications of working short-staffed, employees feel guilty and thus go to work while sick, increasing the risk of exposure of airway infections. Lastly, some staff members expressed distress even when not working, as from their experience they might be called to work due to staff shortage.

Staff shortage has been found to be an area of concern based on Canadian literature. Studies by O'Brien-Pallace and colleagues (2010, 2001) confirm the phenomenon of nurse shortages in Canada,[52,53] a situation that is expected to continue as a result of several factors including supply and demand.[54,55] Researchers have noted that the nurse-to-population ratio decreased from 825 per 100,000 in 1992, to 752 per 100,000

in 1998.[55] Although the ratio slightly increased in 2004 (759 per 100,000), nurses remain in the unenviable position of having to work overtime and working shifts,[56] factors that create a stressful work environment.

Vis-à-vis organizational factors, exposure and contamination was found to be an area of concern with other factors also contributing, such as patients refusing to follow hospital policy or staff members arriving at work sick motivated by preventing their team from working short-staffed. A study examining risk factors related to sickness absence among nurses' aides confirmed that staff are prone to airway infections.[10]

Results from the FG sessions also described that shift work is strongly connected to sickness absence. This is consistent with research studies.[10,13,32,34] However, participants in this study were able to offer broader explanations about why shift work can be hazardous. Working night shift or rotating shifts was described to be unhealthy primarily as a result of poor sleep and self-care. This is consistent with the literature, where an observational study found that newly hired nurses working night shift or overtime were at greater risk of self-injuries such as needle stick injuries.[57] Furthermore, participants described that poor sleep leaves insufficient time to heal from aches and pains, which then predisposes a worker to MSD. Evidence suggests that poor quality or quantity of sleep increase the odds of developing MSD, including back, neck, and shoulder pain.[58,59] Thus nurses and PSWs are at greater risk of developing MSD, not only due to repetitive behaviours such as lifting patients, but also due to poor sleeping habits.

Aside from working night shifts or rotating shifts, poor sleep is an outcome of working short-staffed, where staff members have to work overtime to compensate for

missing members. It was also reported that nurses and PSWs are distressed following their shift out of fear or anticipation of being called back to work as a result of staff shortages. As such, this further explains why some employees feel guilty not attending their shift when they are sick and thus, might work feeling unwell. A cross-sectional study examining nurse staffing found similar results.[60] The authors determined that the shortage of nurses lead to job burnout, job dissatisfaction, and poor patient outcomes, including higher incidents of mortality. This issue might have even greater implications in northeastern Ontario, where there are limited connected health care facilities to pool a larger nursing alternate list compared to southern Ontario.

Safety climate and a supportive work environment were found to be critical in terms of time loss. Participants stressed that there is a certain degree of acceptance that patient violence and harassment are "a part of the job." Key informants, nurses and PSWs' reports of ineffective or unavailable debriefing suggested there is a degree of burnout in a nursing staff's work and personal life as a consequence of such incidents. This is concerning since burnout has been found to increase the odds of sickness absence in nursing staff.[61] This matter is worsened when there is lack of support in the workplace by way of proper debriefing after certain incidents from staff leaders. Consistent with our findings, a study examining leadership and sickness absence determined that leadership styles that were mostly task-oriented, whether the work demands were high or low, increased the odds of sickness absence.[62] Alternatively, having strong relationships with staff, irrespective of the work demand, decreased the odds of sickness absence. This is particularly important in settings such as pediatric units or hospices where nurses report higher levels of compassion fatigue and guilt.

Nursing staff working in northeastern Ontario, particularly the City of Greater Sudbury might be at an extra a disadvantage during winter months due to poor weather and road conditions. PSWs providing home care services were viewed to be at greater risk during winter. This is due to how essential their services are for patients who are unable to complete self-care duties. This issue has great implications to northeastern Ontario given its demographics. Specifically, northeastern Ontario's population is expected to increase from 18% to 30% by 2036 for seniors (65+).[63] Collectively, the estimated number of seniors is expected to increase by 42%.

### 4.7.1 Transferability and Confirmability

The identified factors discussed in the FG sessions were fairly in line with previous research. However, what this study adds is how and why such factors lead to sickness absence. Nevertheless, the presented results support a level of transferability, which speaks to the generalizability of the study. This is based on some consistencies in the findings with previous research on sickness absence among nursing staff.[50,65] This is important to note, given that our participants were recruited from the same region, which could have impacted the study's transferability. As discussed earlier in this paper, transcript and data checks were made to ensure that data is accurate and not misconstrued, which helped mitigate issues with confirmability. In addition, similar strategies to those used to address transferability were also used to further enhance the study's confirmability. Specifically, through our search of the literature, we discovered that our results were in line with previous research irrespective of cultural differences, indicating that our results were authentic.

### 4.7.2 Recommendations

This study highlighted some of the challenges that nursing populations encounter that can lead to sickness absence. Nevertheless, researchers and policy makers need to consider a broader view of the risk factors associated with sickness absence rather than making efforts to pinpoint specific factors. For instance, results from this study revealed that staff shortage is an underlying factor to several physical and emotional issues causing sickness absence. While health care organizations are not often well funded to provide a full team of nursing staff, recommending the hiring of more staff members is likely unrealistic. However, researchers, employers, and policy makers should consider the costs involved to hire more staff members in comparison to the costs paid towards disability claims due to staff shortage. Hiring more staff and work slightly less hours could also remedy sickness absence attributed to staff shortage. Perhaps, longitudinal studies should examine the difference between working fewer hours, staff incentives etc. While recruitment might be fiscally challenging, it could reduce sick leave costs that have been shown to increase in Canada.[67]

Our findings also recommend the emphasis on positive relationships between nursing staff and their leadership team. This can be done through scheduled meetings focusing on employee relations and team-building. Through a good relationship, leaders can better assess the health and performance of their staff, and potentially recognize and prevent antecedents of sickness absence. Additionally, it allows for better debriefing when difficult situations occur. Evidence from the literature suggests that due to the fast-paced environment in the health care field, debriefing is not commonly exercised.[68] However, Nocera and Meritt (2017) explained that debriefing has several benefits, which

include: reviewing the team's performance, education, identification of what went wrong and how it could have been prevented, if possible, and better planning for future events.[69]

This study allowed for nursing staff and key informants to offer their input with workplace matters, specifically sickness absence. While this study offered insightful information on the factors associated with sickness absence and how they may evolve, it is felt that this is merely a stepping stone in finding means to keep nurses and PSWs healthy and able to return to work. In context, further discussions with nursing personnel and key informants along with policymakers should take place to collaboratively find practical solutions to minimize the risks associated with sickness absence.

**4.8 Conclusion**

Results from this study suggest that factors associated with sickness absence are multifactorial, interconnected, and difficult to manage. Our findings have been consistent with the literature concerning the factors related to sickness absence, which include challenges with organizational structure, the job's impact on one's physical health, specifically with the development of musculoskeletal disorders, psychological/mental health factors consequential to job role, and factors that were described as unique to northern regions. They also offered reasons why such factors may lead to sickness absence through their work experiences. With this in mind, we found the manifestation of some factors seemed to be triggered by other underlying factors, mainly staff shortages.

## References


1. Garrosa E, Rainho C, Moreno-Jiménez B, Monteiro MJ. The relationship between job stressors, hardy personality, coping resources and burnout in a sample of nurses: a correlational study at two time points. *Int J Nurs Stud.* 2010;47:205-15.

2. Garrosa E, Moreno-Jiménez B, Liang Y, González JL. The relationship between socio-demographic variables, job stressors, burnout, and hardy personality in nurses: an exploratory study. *Int J Nurs Stud.* 2008;45:418-27.

3. Dabboussy M, Uppal S. *Work Absences in 2011. Statistics Canada Catalogue no*. 75-001-X Perspectives on Labour and Income. Ottawa,ON: Statistics Canada; 2012:1-11.

4. Pompili M, Rinaldi G, Lester D, Girardi P, Ruberto A, Tatarelli R. Hopelessness and suicide risk emerge in psychiatric nurses suffering from burnout and using specific defense mechanisms. *Arch Psychiatr Nurs.* 2006;20:135-43.

5. Davey MM, Cummings G, Newburn Cook CV, Lo EA. Predictors of nurse absenteeism in hospitals: a systematic review. *J Nurs Manag.* 2009;17:312-30.

6. Southgate E, James C, Kable A, Bohatko-Naismith J, Rivett D, Guest M. Workplace injury and nurses: insights from focus groups with Australian return□to□work coordinators. *Nurs Health Sci*. 2011;13:192-8.

7. Duijts SFA, Kant I, Swaen GMH, van den Brandt PA, Zeegers MPA. A meta-analysis of observational studies identifies predictors of sickness absence. *J Clin Epidemiol.* 2007;60:1105-15.

8. Alexopoulos EC, Tanagra D, Detorakis I, Gatsi P, Goroyia A, Michalopoulou M, et al. Knee and low back complaints in professional hospital nurses: occurrence, chronicity, care seeking and absenteeism. *Work*. 2011;38:329-35.

9. What degree of work overload is likely to cause increased sickness absenteeism among nurses? Evidence from the RAFAELA patient classification system. *J Adv Nurs.* 2007;57:286-95.

10. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence attributed to airway infections: a three month prospective study of nurses' aides. *Occup Environ Med.* 2004;61:45–51.

11. Elstad JI, Vabø M. Job stress, sickness absence and sickness presenteeism in Nordic elderly care. *Scand J Soc Med.* 2008;36:467-74.

12. Smedley J, Egger P, Cooper C, Coggon D. Prospective cohort study of predictors of incident low back pain in nurses. *BMJ*. 1997;314:1225-5.

13. Ferreira RC, Griep RH, Fonseca M. A multifactorial approach to sickness absenteeism among nursing staff. *Rev Saúde Publica*. 2012;4692):259-268

14. Eriksen W, Bruusgaard D. Physical leisure-time activities and long-term sick leave: a 15-month prospective study of nurses' aides. *J Occup Environ Med.* 2002;44:530-8.

15. Pompeii LA, Lipscomb HJ, Schoenfisch AL, Dement JM. Musculoskeletal injuries resulting from patient handling tasks among hospital workers. *Am J Ind Med.* 2009;52:571-8.

16. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence: a three month prospective study of nurses' aides. *Occup Med.* 2003;60:271-8.

17. Carneiro IG, Ortega A, Borg V, Hogh A. Health and sickness absence in Denmark: a study of elderly-care immigrant workers. *J Immigr Minor Health*. 2010;12:43-52.

18. Nilsson A, Lindberg P, Denison E. Predicting of pain, disability, and sick leave regarding a non-clinical sample among Swedish nurses. *Scand J Pain.* 2010;1:160-6.

19. Roelen CAM, Magery N, van Rhenen W, Groothoff JW, van der Klink JJL, Pallesen S, et al. Low job satisfaction does not identify nurses at risk of future sickness absence: results from a Norwegian cohort study. *Int J Nurs Stud.* 2013;50:366-73.

20. Pompeii LA, Lipscom HJ, Dement JM. Predictors of lost time from work among nursing personnel who sought treatment for back pain. *Work*. 2010;37:285-95.

21. Horneij EL, Jensen IB, Holmström EB, Ekdahl C. Sick leave among home-care personnel: a longitudinal study of risk factors. *BMC Musculoskelet Disord*. 2004;5:38.

22. Eriksen W. Work factors as predictors of intense or disabling low back pain: a prospective study of nurses' aides. *Occup Med*. 2004;61:398-404.

23. Jensen JN, Karpatschof B, Labriola M, Albertsen K. Do fear-avoidance beliefs play a role on the association between low back pain and sickness absence? A prospective cohort study among female health care workers. *J Occup Environ Med.* 2010;52:85-90.

24. Bourbonnais R, Mondor M. Job strain and sickness absence among nurses in the province of Quebec. *Am J Ind Med.* 2001;39:194-202.

25. Roelen CAM, Schreuder JAH, Koopmans PC, Moen BE, Groothoff JW. Sickness absence frequency among women working in hospital care. *Occup Med*. 2009;59:502-505.

26. Schreuder JAH, Roelen CAM, Koopmans PC, Moen BE, Groothoff JW. Effort–reward imbalance is associated with the frequency of sickness absence among female hospital nurses: a cross-sectional study. *Int J Nurs Stud.* 2010;47:569-76.

27. Smedley J, Egger P, Cooper C, Coggon D. Manual handling activities and risk of low back pain in nurses. *Occup Med*. 1995;52:160-3.

28. Letvak S, Ruhm CJ, McCoy T. Depression in hospital-employed nurses. *Clin Nurse Spec.* 2012;26:177-82.

29. Gärtner FR, Nieuwenhuijsen K, van Dijk FJH, Sluiter JK. The impact of common mental disorders on the work functioning of nurses and allied health professionals: a systematic review. *Int J Nurs Stud.* 2010;47:1047-61.

30. Reis RJ, La Rocca PF, Silveira AM. Factors related to sickness absenteeism among nursing personnel. *Rev Saúde Publica*. 2003;37(4).

31. Gorman E, Yu S, Alamgir H. When health care workers get sick: exploring sickness absenteeism in British Columbia, Canada. *Work*. 2010;35:117-23.

32. Bourbonnais R, Vinet A, Meyer F, Goldberg M. Certified sick leave and work load. A case referent study among nurses. *J Occup Med*. 1992;34:69-74.

33. Bourbonnais R, Vinet A, Vezina M, Gingras S. Certified sick leave as a non-specific morbidity indicator: a case-referent study among nurses. *Br J Ind Med.*1992;49:673-8.

34. de Castro, AB, Fujishiro K, Rue T, Tagalog EA, Samaco Paquiz L, Gee GC. Associations between work schedule characteristics and occupational injury and illness. *Int Nurs Rev*. 2010;57:188-94.

35. Muecke S. Effects of rotating night shifts: A literature review. *J Adv Nurs.* 2005;50:433-9.

36. Rodriguez-Acosta RL, Richardson DB, Lipscomb HJ, Chen JC, Dement JM, Myers DJ, et al. Occupational injuries among aides and nurses in acute care. *Am J Ind Med*. 2009;52:953-64.

37. Prevalence of and risk factors for different measures of low back pain among female nursing aides in Taiwanese nursing homes. *BMC Musculoskelet Disord*. 2007;8:52.

38. Verhaeghe R, Mak R, Maele GV, Kornitzer M, Backer GD. Job stress among middle□aged health care workers and its relation to sickness absence. *Stress Health*. 2003;19:265-74.

39. du Plessis V, Beshiri R, D BR, Clemenson H. Definitions of rural. *Rural Remote Health.* 2001;3:1-17.

40. Nowrouzi B, Lightfoot N, Carter L, Larivère M, Rukholm E, Belanger-Gardner D. Workplace system factors of obstetric nurses in Northeastern Ontario, Canada: using a work disability prevention approach. *Saf Health Work*. 2015;6:305-11.

41. Carosi A, Lightfoot N. Predictors of workplace absenteeism in cancer care workers. *Curr Oncol.* 2009;16(6):2-4.

42. Whitaker SC. The management of sickness absence. *Occup Med*. 2001;58:420-4.

43. College of Nurses of Ontario. *Practice Guideline*. Toronto: ON: College of Nurses of Ontario; 2014:1–20.

44. Ontario Personal Support Network. *Personal Support Workers: Fact Sheet*. Ontario Personal Support Network. 2014:1–3.

45. North East Local Health Integration Network. *Integrated Health Service Plan 2013-2016*. North East Local Health Integration Network; 2013:1–39

46. Bronfenbrenner U. *The Ecology of Human Development*. Harvard University Press;1981.

47. Krueger RA, Casey MA. *Focus Groups: A Practical Approach for Applied Research.* 5th ed. Thousand Oaks, CA: Sage Publications;2015.

48. Braun V, Clarke V. Thematic analysis. In Cooper PM et al. *APA Handbook of Research Methods in Psychology*. Washington, DC: American Psychological Association;2012; 2:57-71

49. *NVivo* qualitative data analysis software. Version 11. QSR International Pty Ltd; 2017.

50. Shenton A. Strategies for ensuring trustworthiness in qualitative research projects. *Educ Inform.* 2004;22:63-75.

51. Shamian J, O'Brien-Pallas L, Thomson D, Alksnis C, Kerr MS. Nurse absenteeism, stress and workplace injury: What are the contributing factors and what can/should be done about it? *Int J Sociol Soc Policy.* 2003;23:81-103.

52. O'Brien-Pallas L, Murphy GT, Shamian J, LI X, Hayes LJ. Impact and determinants of nurse turnover: a pan-Canadian study. *J Nurs Manag.* 2010;18:1073-86.

53. O'Brien-Pallas LL, Doran DI, Nursing MM. Evaluation of a client care delivery model, part 1: variability in nursing utilization in community home nursing. *Nurs Econ.* 2001;19(6):267-276.

54. Basu K, Gupta A. Nursing shortages: where and why. *Health Policy Research Bulletin.* 2007;13:21-25.

55. Rajbhandary S, Basu K. Working conditions of nurses and absenteeism: is there a relationship? An empirical analysis using National Survey of the Work and Health of Nurses. *Health Policy*. 2010;97:152–159. 56.

56. Greenslade M, Paddock K. *W*orking conditions of nurses: a cause for concern. *Health Policy Research Bulletin*. 2007;13:1-46.

57. Stimpfel AW, Brewer CS, Kovner CT. Scheduling and shift work characteristics associated with risk for occupational injury in newly licensed registered nurses: an observational study. *Int J Nurs Stud.* 2015;52:1686-1693.

58. Caruso CC, Hitchcock EM, Dick RB, Russon JM, Schmit JM. Overtime and extended work shifts: Recent findings on illnesses, injuries, and health behaviors. *National Institute for Occupational Safety and Health.* NIOSH 2004-143. 2004:1-49.

59. Ruggiero JS. Correlates of fatigue in critical care nurses. *Res Nurs Health*. 2003;26:434-44.

60. Aiken LH, Clarke S, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA*. 2002;288:1987-93.

61. Anagnostopoulos F, Niakas D. Job burnout, health-related quality of life, and sickness absence in Greek health professionals. *Eur Psychol.* 2010;15:132-41.

62. Shreuder JAH, Roelen CAM, van Zweeden NF, van der Klink JJL, Groothoff JW. Leadership styles of nurse managers and registered sickness absence among their nursing staff. *Health Care Manage Rev.* 2011;36:58-66.

63. North East Local Health Integration Network. *North East Local Health Integration Network: Population Health Profile.* North East Local Health Integration Network. 2012;1-4.

64. Rolfe G. Validity, trustworthiness and rigour: quality and the idea of qualitative research. *J Adv Nurs.* 2006;53(3):304-10

65. Golafshani N. Understanding reliability and validity in qualitative research. *Qual Rep*. 2003;8:597-607

66. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today.* 2004;24:105-12.

67. Martin S. The staggering cost of illness and injury. *CMAJ.* 2003;168:332.

68. Healy S, Tyrrell M. Importance of debriefing following critical incidents. *Emerg Nurse.* 2013;20(10):32-37.

69. Nocera N, Merritt M. Pediatric critical event debriefing in emergency medicine training: an opportunity for educational improvement. *AEM Educ Train.* 2017;1:208-14.

# CHAPTER 5:

# Discussion

## 5.1 Overview

This dissertation examined sickness absence among nurses and health care aides (HCAs). Guided by the Evidence-based Practice in Occupational Health Psychology (EBPOHP) framework,[1] this study aimed to: (1) Identify factors associated with sickness absence; (2) understand how those factors might lead to sickness absence; and (3) determine if there were factors specific to, or of greater risk, in northeastern Ontario. Meta-analytic computations were employed to identify factors associated with sickness absence by statistically pooling observational studies drawn from the literature, then obtaining overall effects. Also, nursing staff along with key informants in the fields of nursing, occupational health and safety, disability management, and rehabilitation, took part in focus group sessions to gain an understanding of how factors associated with sickness absence might lead to lost time, with a focus on working in northeastern Ontario. This section will discuss the conceptual framework used to guide this investigation and briefly present the findings from all studies (Chapters 2, 3, & 4). Next, a conceptual model depicting the manifestation of lost time among nursing staff based on the culmination of this thesis, is presented. To better understand how this model was conceptualized, a well-balanced discussion is provided, highlighting findings across the three chapters of this thesis while synthesizing the quantitative and qualitative results. Finally, this investigation's methods will be discussed in terms of limitations and future direction.

## 5.2. Evidence-Based Practice in Occupational Health Psychology (EBPOHP)

To address the objectives of this investigation, an evidence-based approach was

required. Evidence-based methods allow integrating findings from up-to-date research, using clinical experience, and reaching out to individuals affected by the treatment or outcome.[2,3] To this end, The EBPOHP[1] was the overall guiding framework of this investigation. Briner (2012) proposed four elements to reach evidence-based findings which include: (1) Evaluation of external evidence, (2) context and local evidence, (3) practitioners' experience and judgment, and (4) stakeholders' needs and values.[1]

Conceptually, investigating external sources was achieved through Chapters 2 and 3, which were the meta-analytic studies of the investigation. The systematic review portion of the investigation allowed for a rigorous yet methodical approach to scrutinize the literature. The meta-analyses helped address the issue of conflicting findings between studies by applying statistical methods to reach an overall effect. Meta-analyses are highly regarded when seeking evidence of good quality. Typically, meta-analyses with pooled experimental studies; randomized controlled trials (RCTs) particularly are considered the best source of evidence. However, this was not feasible given the objectives of this investigation. Thus, while this could be viewed as a methodological limitation, it is due to the nature of work required to research sickness absence.

In the context of this investigation, we selected the City of Greater Sudbury as "local" evidence for northeastern Ontario. It is important to note that we conceptualized local evidence differently from the original theoretical framework; where the intention was to look investigate specific organizations etc.[1] Through this strand of the framework, we were able to determine two northern-specific factors that might influence sickness absence. These are the lack of interconnectivity between health networks and poor driving conditions, particularly for HCAs; these were described as factors that could lead

to sickness absenteeism. In the context of this investigation, the key informants from the focus group served as the practitioners, as they are the professionals who work with and support nursing staff. By discussing factors associated with sickness absence among nurses and HCAs with union representatives, disability managers, occupational health specialists, and rehab specialists, a comprehensive understanding of sickness absenteeism was sought from various sources by experts. Finally, nurses and HCAs are the individuals affected by sickness absence, and their insight was helpful to better understand this outcome. This was addressed by conducting three different focus group sessions with registered nurses, registered practical nurses, and personal support workers (described here as HCAs). Gaining insight from both the nursing staff and key informants allowed us to gain a well-balanced understanding of how sickness absence might occur. This framework also allowed for the use of a mixed-methods approach that helped conceptualize sickness absence from a local perspective (northeastern Ontario) and more broadly. Guided by this conceptual framework, the synthesis of the qualitative and quantitative findings was helpful in identifying and understanding the phenomenon of sickness absence. Please see Figure 1.

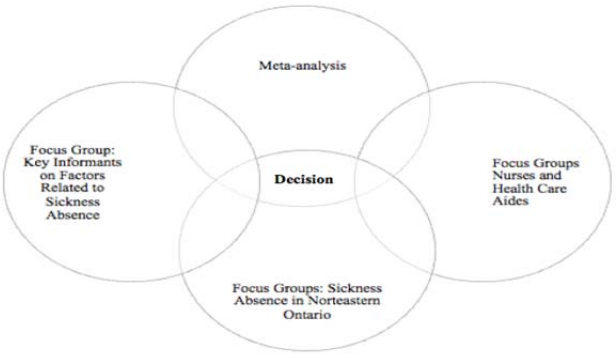


**Figure 1**. Conceptualization of the Evidence-Based Practice in Occupational Health Psychology: Evidence-Based Approach to Examine Sickness Absence (Adopted from Briner, 2012)

### 5.3 Sickness Absence: Amalgamation of Quantitative and Qualitative Findings

Two studies (Chapters 2 & 3) helped to quantify factors associated with sickness absence from the extant literature by way of meta-analyses. This method helped to synthesize the literature and at the same time, minimize conflicting findings between studies. A number of variables were found to statistically increase (or decrease) the odds of sickness absence in nursing employees (Table 1). These variables can be categorized under personal and health factors, and organizational factors. Personal and health factors include: perceived health, history of sick leave, musculoskeletal pain, physical and emotional fatigue, anxiety/depression, sex (female), and job classification (HCA). Organizational factors include: night shift, working in pediatric or psychiatric units, work demand, and work support.

Results from the thematic analysis (Chapter 4) confirmed most of the findings obtained from the meta-analyses and incorporated additional factors, which were deemed to influence sick leave. The qualitative themes included: the impact of the job on one's physical health, psychological/mental health factors consequential to job role, challenges emerging from the organization, and factors described as unique to the northeastern region of Ontario. Physical and mental health factors included: musculoskeletal pain, anxiety, burnout, and guilt reportedly influenced the risk of sick leave. Exposure to contaminants and shift work including extended hours, night shifts, and rotation shifts were some of the organizational factors involved in the occurrence of sick time. Other organizational factors included: safety climate and work support, working in pediatrics and long-term care facilities, and working in acute care settings such as psychiatric units or emergency departments. Lastly, limited interconnectedness between health network,

and poor driving conditions were factors identified as specific to northeastern Ontario (Table 1).

| Quantitative Findings (Meta-analysis) | Qualitative Findings (Thematic Analysis) |
|---|---|
| **Personal & Health Factors**<br>• Perceived health<br>• History of sick leave<br>• Musculoskeletal pain<br>• Fatigue (physical)<br>• Fatigue (emotional exhaustion)<br>• Anxiety/depression<br>• Sex<br>• Job classification (nurse vs. HCA)<br>**Organizational Factors**<br>• Shift work (night shift)<br>• Unit Placement: psychiatry & pediatrics<br>• High work demand<br>• Work support | **Personal & Health Factors**<br>• Musculoskeletal Pain<br>• Anxiety<br>• Burnout<br>• Guilt<br>**Organizational Factors**<br>• Exposure<br>• Shift work (extended hours, night shift & rotating shifts)<br>• Safety climate/work support<br>• Work setting (pediatrics, long-term care facilities, and acute care settings such as psychiatry and emergency department)<br>**Northern-Ontario specific Factors**<br>• Interconnected health care networks in northern Ontario<br>• Weather and road conditions in northern Ontario |

**Table 1.** A List of Factors Related to Sickness Absence Based on Quantitative and Qualitative Findings

Upon conceptualizing the results drawn from this study, it was difficult to classify each factor under one specific category or theme. As an example, experiencing burnout could be described as a health or an organizational outcome. Nevertheless, I present the aforementioned categories with their corresponding variables for a simple depiction of the elements involved in the occurrence of sickness absence. It is important to note; however, that following this investigation, I determined that relying solely on a "list" of factors to understand sickness absenteeism in the nursing profession would be deemed as too simplistic or one-dimensional for future work such as policy changes. Integrating the results from the three chapters helped to identify variables related to sick time and offer insight on why staff might go on sick leave. Unsurprisingly, I discovered that sick leave is rarely an outcome of one specific factor. Instead, it appears to be an outcome of various influences. Particularly, this study's findings point to the complexity and intricacy of the manifestation of sickness absences. To this end, each factor will be

discussed in relation to how other factors might be involved. Therefore, some factors will reappear in different sections of this discussion section. In addition, due to the intertwined nature of sickness absence, some variables highlighted earlier will not be discussed in their respective categories. Instead, each variable is strategically positioned to allow for a comprehensive yet a fluid discussion.

Statistically, I discovered that some variables did not increase or decrease the odds of lost time, as per the meta-analyses. However, they still played a role in the occurrence of this phenomenon. In context, narrative data helped elucidate why some variables were not statistically associated with sickness absence, yet served as influencing factors on the occurrence of sickness absence; this was helpful in proposing a conceptual model on the occurrence of sickness absence. These factors included health and personal includes organizational factors such as increased job strain, decreased decision latitude, and job dissatisfaction (Table 2). Given their contributing role in the occurrence of sickness absence, as per the qualitative findings, these variables are also discussed in this section.

| Personal and Health Characteristics | Organizational Factors |
|---|---|
| • Sleep<br>• Physical Activity<br>• Age | • Job Strain (increased job demand and low decision latitude)<br>• Decision Latitude<br>• Job Satisfaction |

**Table 2**. Meta-Analytic Variables Not Statistically Associated with Sickness Absence

## 5.4 A Comprehensive Conceptual Model of Sickness Absence with Considerations for Northeastern Ontario

As will be further explained in this discussion, identifying how sickness absence occurs is multidimensional. It is important to note that there could be additional factors associated with sickness absence that were not obtained from this investigation due to

methodological reasons, reasons which are described in the limitations sections. Nevertheless, the findings of this study point to the interrelationship of variables, which ultimately lead to sickness absence. Staff shortage, which is discussed in greater detail at the latter segment of this discussion, served as a precursor to a number of the factors presented in this investigation. Evidence indicates that staff shortage increased the odds of intention to leave.[6] This is of concern as the literature indicates that the factors that increase the odds of sick leave are the same as the factors related to intention to leave of intention to leave.[7] As such, it is possible that the magnitude of the elements that jeopardize the safety and health of the nursing employees are far greater, but remain unknown, as employees might be quitting the workplace without indicating the causes.[8]

Based on the findings of this dissertation research, a model presenting the paths associated with sickness absence is proposed (Figure 2). These paths are based on statistical and qualitative findings, mixed with further research on the association between identified variables. Some variables such as job strain or physical activity did not show a statistical link with sickness absenteeism, but the qualitative study and further review of the literature offered indirect connections. Given their potential impact on sickness absence, these factors are also included in the model, but are delineated with red connections.

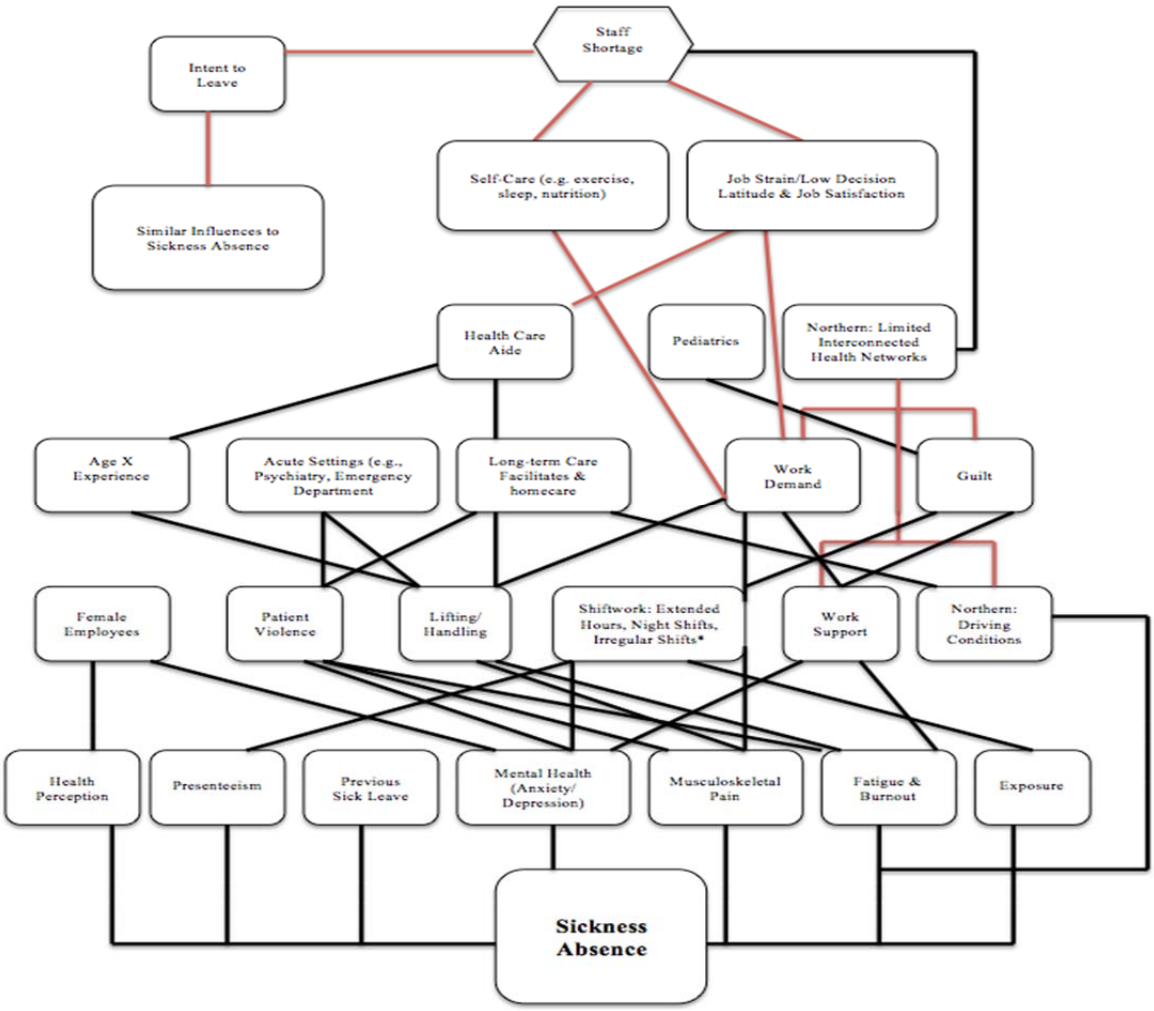


**Figure 2**. Proposed Conceptual Paths to Sickness Absence

## 5.5 Sickness Absence Explained

To better understand the conceptual paths presented in Figure 2 in relation to sickness absenteeism, results from the three chapters are discussed below.

### 5.5.1 Health and Personal Characteristics

Results from the meta-analysis revealed that history of sick leave is a cogent predictor of future sickness absence with an overall odds ratio (OR) of 3.35 (CI 95%= 2.37 – 8.19). The premise of historical incidents serving as predictors of future events is not uncommon in various health disciplines including risk assessment.[9-14] However,

participants from the focus groups explained the complexity of recurrent sick leaves within the profession. Specifically, they noted that the reoccurrence of sickness absence does not necessarily mirror the initial reason for sick leave. The presentations could be vastly different. For instance, a physical injury could later manifest into a psychological disorder such as depression or anxiety, and vice-versa. At the same time, what was deemed as a physical disability during a disability claim might have had psychological roots, or a psychological issue could, in part, have transformed into a physical form.[15] Therefore, a more "comprehensive" evaluation of a nursing staff upon sick leave claims was recommended to better understand the root cause of sick leave for better interventions. Irrespective of the antecedents involved, the findings from the meta-analysis and the focus groups confirm that previous sick leave increases the odds of future sick leaves.

Female nursing personnel were found to be at greater risk of sickness absence than male staff. Statistically, results from meta-analysis revealed that female nurses have odds of 1.73 (CI 95%= 1.33 – 2.25) of experiencing sickness absence than their male counterparts. Participants from the focus groups did not identify this particular factor as being related to sickness absence. However, it is likely difficult for nurses and HCAs to accurately compare sickness absence between sexes, as they might not likely have sufficient data to do so. Key informants also did not identify this particular factor as being related to lost time. However, it is difficult to ascertain that it does not exist simply because it was not recognized. One explanation could be that the labour characteristics for the City of Greater Sudbury, and at large for Canada, show that staff are mostly female. Specifically, Statistics Canada data revealed that over 80% of employees

working in the health care field are female.[16] Thus, with discrepancies between sexes, it could be difficult to make such comparison.

Despite a recent surge of male nurses in the workforce, nursing continues to be female-dominated occupation.[17] Research on sickness absence among nurses and the broader health care sector also revealed higher rates of sickness absence in female staff compared to their male counterparts.[18,19] Likewise, such trends were also found in other occupational sectors that are not female-dominated.[18,20-22] What was surprising is that some research findings suggest that male nursing staff have poorer physical health outcomes than female staff. For instance, a study that examined the health of Australian and New Zealand nurses found that male nurses have higher rates of obesity and metabolic problems and had more restrictions on their mobility than female nurses.[23] Yet, the researchers found that female nurses reported higher rates of stress and burnout. Therefore, female nursing staff could be in better physical health than male staff, but might struggle more with mental health factors. Alternatively, it could be that female employees are more likely to report health concerns or the need for sickness absence than men. Specifically, female staff could be more attuned with their health and thus, be more likely the report sickness absence than males.[23] This finding is consistent with a Finnish study that examined the reporting of sickness absence between genders.[21] The authors discovered that while females had higher reports of poor health than males, female employees were not at greater risk of experiencing adversarial effects in the workplace. Instead, they found that women were more likely to report health concerns or the need for sickness absence than men.[21] This is also in line with research on the reporting of mood disorders between men and women. Irrespective of occupation, women were likely to

report signs of depression sooner than men, which helps explain treatment effectiveness.[24]

Given that the nursing profession remains female-dominated, this could, in part, explain why health perception was shown to be associated with sickness absence. Specifically, with research suggesting female nurses have higher rates of psychosocial factors such as burnout[23] and are more attuned with their health, it is not surprising to find that one's health perception is associated with sickness absence, as per the meta-analysis. Results from the meta-analysis revealed that those who rated their health as poor are almost 1.4 times more likely to go on sick leave (OR= 1.38; CI 95%= 1.19 - 1.60). Each of the six studies pooled into the analysis were study statistically significant.[13,25-29] This finding is particularly important for employers to seek appropriate interventions prior to staff going on sick leave. Interestingly, over 80% of the sample in each study consisted of female nurses and HCAs. Another interesting finding is that health perception was not reported as one of the factors related to sickness absence as per the focus group sessions, whilst the majority of the participants were females. However, two considerations should be made with respect to the findings on health perception. Firstly, from a statistical standpoint, the overall effect of poor health perception and sickness absence was highly heterogeneous (Q= 29.02, $p<.05$; $I^2$= 82.77%) and thus, this finding should be interpreted with a degree of caution.[30] Secondly, from a qualitative context, it could potentially be difficult to classify health perception as an indicator of sickness absence, as it is suspected that the participant's health is their primary indicator. Thus, it could be challenging to report this as a possible factor related to sickness absence given that the

participants might not have experienced sickness leave or perceive his or herself as healthy.

One further consideration in terms of sickness absence between sexes is additional commitments outside the workplace. Some studies suggested that women might have to fulfill several roles in their day, such as working full time and caring for children.[15] Results from an international study that sought to examine factors related to sickness absence revealed that married women had significantly higher risks of sickness absence than single (never-married) women.[18] Additionally, irrespective of sex, divorced or separated nurses and HCAs had higher odds of sickness absence than those with partners.[28,31] They indicated that the sharing of household and family responsibilities was among one of the factors that could explain the finding.

Meta-analytic findings suggest that HCAs have slightly greater odds of sickness absence than other nursing staff (OR= 1.2 CI 95%= 1.10 – 1.30). While the overall effect is not strong, it remains statistically significant. Furthermore, a number of the studies pooled into this analysis looked exclusively at HCAs and revealed several factors associated with sickness absence.[26,27] Notwithstanding the statistical effect, results from the qualitative portion offered insight on some of the risks involved with the HCA profession. Participants from the focus groups described that some of the HCAs' job duties pose risks of sick leave due to musculoskeletal pain. Inherently, age and experience might also contribute to this outcome. Additionally, with one of their main duties including patient handling such as feeding and cleaning, their risk increases. This finding is of great concern, as previous research indicates that patient handling accounts for approximately 33% of musculoskeletal disorder (MSD) claims.[32] Remarkably, the

same study revealed that HCAs have the highest injury rates compared to other health care staff.[32]

Focus group participants explained that working in long-term care facilities is among the other factors that put HCAs at risk of sick leave. Reportedly, such settings employ a large portion of HCAs, and the level of care is typically high, as they often support incapacitated patients who might suffer from neurocognitive conditions such dementia and delirium. Thus, they deal with factors such as non-compliance and are exposed to the unpredictability of patient behaviour, including patient violence.[33] Due to study eligibility (e.g., study design, sample, outcome of interest etc.), we did not have sufficient enough data to pool studies that examined the relationship between patient violence on nursing staff and sickness absence. However, reports from the qualitative study in conjunction with evidence from the literature suggest that patient violence is not uncommon and is increasing within the health care sector.[34-37] In addition to the physical implications on HCAs and the broader nursing profession, patient violence also has emotional inferences.[38-40] For instance, a study on HCAs determined that increased exposure to threats and violence could lead to psychological distress including depression.[38] Similar findings were discovered in another study examining nurses and HCAs working in teaching hospitals in France.[40] Specifically, the authors determined that HCAs had higher rates of depression than nurses. In another study, the researchers explored the implications of violence on nursing staff across 10 European countries.[36] The authors concluded that HCAs had statistically significant odds of suffering from burnout (OR= 1.56; CI95%= 1.15 – 2.11) and intent to leave the profession (OR= 1.28; CI95%= 1.13 – 1.45). They also found that increased physical load increased the odds of

burnout among HCAs in comparison to nurses.[36] HCAs were found to have greater odds of sickness absence than nurses, which is consistent with Canadian data.[41] Although both positions are commonly pooled together in research, some elements of their job duties are quite dissimilar. Typically, HCAs have less educational training than nurses, which prevents them from undertaking various medical procedures that registered nurses might assume. They are also paid less. HCAs often support patients with activities of daily living including mobilization, feeding, and cleaning. There may be unique physical and emotional risks with such work. Physically, patient handling can lead HCAs to suddenly move or lift from awkward positions, which in turn leads to musculoskeletal injuries[25]. Also, there is greater risk of physical abuse as a result of patient behaviours for HCAs since they provide essential care to patients who often cannot complete self-care autonomously.

Providing home care to patients, who were typically older adults, was another factor described to increase the risk of HCAs, particularly in northeastern Ontario. This investigation relied on the qualitative portion given the dearth in research concerning sickness absence on nursing staff in this region. As explained in Chapter 4, an HCA "has to be there" for patients as they provide essential services such as feeding and cleaning. Therefore, it was explained that it is more challenging to cancel appointments. A recent newspaper article from Sudbury indicated that HCAs are often victims of patient abuse and disrespect, and in turn, are underpaid.[42] Research that focused exclusively on home health care workers identified high injury rates, specifically musculoskeletal pain due to issues such as unassisted client lifting, supporting patients while walking, or suddenly catching them if they slip.[43]

Research on HCAs providing home care services in Ontario revealed the challenges of poor weather conditions.[44] Participants (who work in northeastern Ontario) indicated that there is a risk in commuting long distances in poorly serviced areas within the City of Greater Sudbury due to poor climate and road conditions, and cellular reception. While Sudbury itself is considered to be an urban city, some of its surrounding areas that fall under the City of Greater Sudbury were more challenging to reach in poor conditions, as indicated by participants. This particular issue is one of the challenges of working in northeastern Ontario. Respectively, a common issue faced within northern Ontario is service provision to a relatively small population residing over a large land mass.[45] This issue has further implications due to an expected increase in the elderly population. Recent figures from the Local Health Integration Network estimated an increase of up to 30% in senior citizens by the year 2036 in northeastern Ontario. Collectively, the estimated number of seniors is expected to increase by 42%.[46] Similar trends were found in the western region of northern Ontario.[47] Thus, the demands for HCA support will likely increase.

Perhaps one factor that is unequivocally related to sickness absence is musculoskeletal pain. All studies pooled into the meta-analysis revealed a strong significant association between musculoskeletal pain and sickness absence.[26-28,48-51] The overall effect suggests that nursing staff have odds as high as 2.41 (CI 95%= 1.77 – 3.27) of experiencing lost time if they suffer from musculoskeletal pain. Those odds are suspected to be even greater should the pain be centralized in the back region of the employee with an overall effect of 3.05 (CI 95%= 1.66 – 5.62). This is of concern, as evidence from prior research suggests that back pain is the most common form of

musculoskeletal complaint.[52,53] Results from the qualitative study also concluded that musculoskeletal pain is a common yet a costly concern in this population. One participant described MSD as "the number one career ender." Another important consideration pointed out by participants is the level of severity of the pain. In context, a worker might overlook minor pain or ache, which later form into a more chronic condition. This issue appears to be common, as research on nurses and HCAs indicates that the employees often disregard minor aches or reluctant to report musculoskeletal aches.[54,55]

Participants from the focus groups explained that the healing of aches and pains is more challenging with older age. However, their description offered that the level of experience is also linked to age. In context, experience helps to reduce the risk of improper lifting or handling of patients. They noted that this is especially important for HCAs, as they reportedly are more likely to experience musculoskeletal pain. One of the reasons is that they noted that for HCAs, the profession is, at times, a "second or a third career." Thus, they are older and might lack the experience with patient handling. The interrelationship between age and experience described in the qualitative study could partly explain the inconsistencies between the findings in the literature and why age alone was not found to be a clear predictor of sickness absence in the meta-analysis. Specifically, of the five studies pooled in the analysis, three studies detected an association between increased age and sickness absence,[25,48] one study revealed a negative association,[56] and the other did not find a statistical relationship.[51] Furthermore, there is evidence that less experience increases the risk of musculoskeletal pain. For example, in a cohort study that examined nursing personnel who sought

treatment for back pain, the authors found that having less than two years of work experience significantly increased the risk (Risk Ratio= 3.40; CI 95%= 1.6 – 7.1) of long-term (8+ days) sickness absence compared to those with more work experience.[57] Still, there is the inherent increased risk of several chronic conditions with increased age.[58] Accordingly, it is important to consider age and experience jointly when examining risk of musculoskeletal pain or sickness absence rather than independently.

Results from the focus group discussions also revealed that physically demanding duties such as repetitive movements, lifting, and awkward positioning could lead to musculoskeletal pains. Despite the increase in technological and ergonomic advances along with more health and safety awareness in the present workplace, results revealed that patient handling still increases the risks of musculoskeletal pain and ultimately, sickness absence. Specifically, some aspects of the nursing profession are quite unpredictable, especially with patient handling, which might lead them to suddenly move or lift from awkward positions, which in turn leads to injury risks.[25] In addition to the lifting, the frequency or repetition of lifting patients from stretchers or to wheelchairs several times during the day was described as physically demanding, which could lead to forming a chronic MSD. With the inherent risk involved with lifting and patient handling, participants also expressed that there is an interaction between musculoskeletal pain and improper rest due to shift work, which reportedly is a noteworthy contributor to sickness absence. Please see the shift work section for more details.

### 5.5.2 Organizational Factors

Results from the meta-analysis revealed that shift work, specifically night shift, increased the odds and sickness absence among nurses and HCAs (OR= 1.47; CI 95%=

1.23 – 1.77). Results from the qualitative research were in line with this finding. Furthermore, participants offered additional characteristics of shiftwork that might pose a threat to nurses and HCAs and thereby, cause them to be more susceptible to sickness absence. These include extended hours, unplanned shifts, and rotating shifts. Collectively, participants explained that shiftwork disallows the body to heal, and so, musculoskeletal pain might occur, resurface, or intensify. This is line with previous research on the impact of shift work and musculoskeletal pain in nurses and HCAs.[26,27,51,53,59] For example, in a longitudinal study that consisted of 2617 registered nurses, the authors revealed that increased hours, specifically over 13 hour-days, being on call, working mandatory overtime, or working on days off, increased the risk of musculoskeletal disorders due to physical demands.[53]

In addition to the physical strain posed by shift work, negative emotional outcomes were also linked to shift work and sickness absence. As described in Chapter 4, shift work was described as taking "seven years off your life." Some of the reported emotional strains include anxiety, guilt, and stress. Participants indicated that nursing employees are, at times, anxious even when they are not working. This is due to the common practice of being asked to return to work.[60] This offered some enlightenment to the quantitative results, where anxiety/depression was shown to increase the likelihood of sickness absence.

Guilt was also reported as an outcome of shift work, specifically with working extended hours. Participants explained that nursing employees, who might feel ill due to common airway infections, a form of presenteeism (explained in more detail further in this discussion), often attend their shifts out of guilt to avoid other unscheduled personnel

needing to arrive at work. Despite the efforts to reduce unplanned schedules, exposure to contaminants reportedly increased the risk of sick leave.[48] Therefore, the findings suggest that there is an interaction between emotional and physical outcomes due to shift work. In addition to experiencing guilt, evidence from the literature suggests that extended work hours also increase the odds of burnout, which was reported in the qualitative study as a factor related to sickness absence.[61] Results from an American cross-sectional study concluded that nurses working extended hours (i.e., 12 hours or longer) had greater odds of burnout and job dissatisfaction.[61]

Dealing with stress was reported as an innate component involved with shift work. As per the qualitative results, stress occurs in instances such as unplanned overtime, which is when a nursing staff is asked to remain on duty past his or her schedule in the light of the absence of another employee. Some of the stressors incorporated with unplanned overtime include fatigue and being unprepared. In context, unplanned overtime means that the nursing employee is unprepared in terms of meeting self-care needs such as packing proper meals, sleep, and exercise. Unsurprisingly, there is evidence of increased weight among nursing staff working extended hours and night shifts.[62-64] To further exacerbate this issue, weight gain and shift work were also shown to increase the risk of some types of cancers, especially among female staff.[65-67] Moreover, participants explained that in efforts to remain alert and able to complete their duties, nurses and HCAs might self-medicate. Self-medication may include the use of stimulants (e.g., caffeine, smoking etc.) or the taking of sleeping pills in preparation to go on a rotating shift.[68]

Pooled variables related to self-care factors such as physical activity and difficulty sleeping did not statistically influence sickness absence, as per the meta-analysis. However, the qualitative findings offered sufficient content to explain their importance when considering sickness absence as an outcome. Despite the lack of statistical relationship, issues such as poor sleep, limited physical activity, or poor nutrition were considered as compounding factors that cause shift work to be arduous, and unambiguously a threat to nursing employees. A recent study proposed a model, which might explain the indirect relationship between self-care needs and sickness absence[69]. The authors suggested that factors including sleeping, eating, resistance training, and exposure to light, contribute to the protein formation of the muscle and hormone release of shift workers. As these variables compound due to extended hours, working night shift, or rotating shifts, MSD may develop or intensify.[69] Another study determined a relationship between various self-care variables such as limited physical activity, poor sleep, and coping by the use of alcohol, and experiencing chronic fatigue among shift work nurses.[68,70] It is important to note that experiencing fatigue was found to increase the odds of sickness absence in the study (OR= 1.53; CI 95%= 1.14 – 2.06). Thus, examining the factors associated with shift work at an individual level could potentially decrease the odds of sickness absence associated with shift work itself.

As previously discussed in this section, working in long-term care facilities, as well as providing home care services, were described as possible contributors to sickness absence among nursing employees with higher risks for HCAs, especially those working in northeastern Ontario. Meta-analytically, other settings including outpatient facilities, pediatric units, psychiatric units, and surgical units were explored. Surgical units and

outpatient settings were not found to increase the odds of sickness absence, while pediatric and psychiatric units did. In part, this could be because operating rooms are likely more structured in nature. Respectively, there is less vagueness in the role of the nurse during surgery. Furthermore, unlike paediatric and psychiatric units, patients are typically sedated and therefore, less likely to act out aggressively. Outpatient clinics are typically less pressing or hazardous, and thus, patient behaviour is foreseeable. Also, unlike hospital units, outpatient settings are typically limited to daytime hours and hence, nurses and HCAs have consistent shifts that do not typically rotate or require working overnight.

Working in pediatric and psychiatric units was found to increase the odds of sickness absence with ORs of 1.86 (CI 95%= 1.38 – 2.51) and 1.6 (CI 95%= 1.18 – 2.18), respectively. Descriptions from the focus group discussions were consistent with the quantitative findings of this investigation, mainly the risk of sickness absence in pediatric and psychiatric units. The participants also offered some risks involved working in a hospital's emergency department. However, they explained that the risk does not necessarily decrease in other acute care units. Similar to patients with neurocognitive disorders, nurses and HCAs deal with the unpredictable behaviours of patients or visitors who might be intoxicated, experiencing psychotic outbreaks, or angered due to various factors.[71] Thus, while there is evidence suggesting that units such as psychiatry or long-term care have higher odds of patient violence, other findings raise the issues of risk of violence on staff at any unit.[37] For instance, a European cross-sectional study revealed that clinical settings do not have a strong impact on patient and visitor findings. Instead, patient and visitor violence seemed to be more influenced by other factors such as the

type of interaction along with situation-specific influences that occur between the patient and/or visitor and the nursing staff.[37] Therefore, nursing staff must be ready and follow proper safety procedures.[37]

With respect to pediatric care settings, participants indicated that working in pediatric facilities could be emotionally straining, which might lead to experiencing burnout and ultimately, sick leave. Specifically, guilt was described as a commonly reported emotional outcome following the death of a child, as participants noted that, "it is not supposed to happen." Participants expressed that there is an added degree of compassion involved working with children, as most nursing employees are parents with children of their own. Research on pediatric nurses corresponds with the narrative data of this investigation. Firstly, there is evidence suggesting that nurses' grief over their patients' is in some ways is comparable to grief relating to family members.[72,73] Moreover, the results of an American study determined that the death of a young patient increase the nurse's level of emotional exhaustion, which is a primary element of burnout and increases job dissatisfaction.[72,74] A secondary finding was an inverse association between age and guilt. Specifically, the younger the patient, the higher the level of guilt experienced by the nurse within the grieving process.[72,74]

### 5.5.3 Organizational Safety Climate

Safety climate, which is defined as the employees' views and beliefs vis-à-vis the level of safety and risk in their respective workplace was the term used to describe various organizational factors.[75] From a quantitative standpoint, some of these variables were shown to statistically correlate with sickness absence. Qualitatively, additional factors were offered, which further explained the occurrence of sick time. My results

determined that higher work demand increased the odds of sickness absence. High demand, which is one of the key components of the Job Strain Model proposed by Karasek (1979),[76] had an overall effect of 1.57 (CI 95%= 1.14 – 2.06) in my analysis. Consequently, if the occupational demand increases, it could lead to sickness absence due to factors such as fatigue, MSD, and/or burnout.[77-82]

Results demonstrated that job strain, which is the term used to describe the interaction between perceived high demand and low decision latitude, did not increase the odds of sickness absence according to my meta-analytic findings.[76] Similarly, low decision latitude independently was not predictive of sickness absence. This means that only increased job demand was directly linked to sick time. Statistically, the lack of significance from these two constructs was to some degree surprising, but could be explained by the culture of the profession, as described in the qualitative study. Specifically, participants described that there is a level of acceptance with respect to the adverse risks that nursing staff are subjected to. For example, whether it is physical assault or experiencing MSD, it is considered as "a part of the job."

It is important to note that increased job strain as a whole, or low decision latitude independently, could indirectly be associated with sickness absenteeism. For instance, a meta-analytic study examining the association between MSD and job strain discovered that nurses and HCAs who had increased job demand and decreased job control had statistically greater odds of developing MSD.[83] This particular finding compliments the findings obtained from this investigation for two reasons. First, the results of this study revealed that developing musculoskeletal pain increases the odds of lost time. Second, this highlights how physical pain could be an outcome of a psychological/emotional issue

or vice-versa, as indicated by focus group participants. Furthermore, while statistically, low decision latitude did not increase the odds of sickness absence, having low decision latitude increases rates of burnout, which in itself is related to sick leave.[84]

Increased work demand was also shown to be associated with increased burnout.[60,80,84] Burnout, which is a well-known psychological construct in the field of occupational health, is an outcome based on the intricacy between increased emotional exhaustion and depersonalization along with decreased personal accomplishment.[74] Due to the strict eligibility criteria to carry out the systematic review of this investigation, there were no selected studies that directly examined the association between burnout and sickness absence. However, one study, which was pooled with other studies examining fatigue, had odds of 2.34 (CI 95%= 1.59 – 3.45) of sickness absence due to emotional exhaustion.[84] Hence, while we did not have sufficient data to offer a firm conclusion from a meta-analytic standpoint, burnout might indeed be linked to sickness absence. Interestingly, the qualitative data also informed the conclusion that burnout could influence sick time for reasons such as working in pediatric units. Furthermore, previous research points to an association between burnout, job satisfaction, and intention to leave.[85-90] Specifically, job dissatisfaction was shown to increase the likelihood of nursing staff to experience burnout and leave the workplace.[88,89] As an example, a study conducted in northeastern Ontario on obstetric nurses revealed that increased absenteeism in the workplace increased job dissatisfaction due to poor quality of work life.[88] The meta-analytic computations did not discover a statistical relationship between job satisfaction and sickness absence. However, it is suspected that similar to job strain and

low decision latitude an increase in job dissatisfaction could indirectly be related to sick leave within the nursing profession as a result of increased burnout.[36,85,86,90]

As previously discussed, some nursing employees work while sick out of guilt to reduce unplanned schedules for other employees. Participants also reported that exposure to patients with contaminants is another risk with little control. In context, they explained that nurses and HCAs adhere to health and safety guidelines such as wearing masks and washing hands where applicable. However, patients reportedly do not usually follow those guidelines and thereby unintentionally might infect staff members. This issue was noted as of great concern given the commonality in the spread of various viral and airway infections in health care settings.[48,91]

The perceived support by the colleagues or supervisors was statistically related to sickness absence. With sufficient data, we were able to examine the outcome of work support in the meta-analysis bi-directionally. Results revealed an inverse relationship where increased work support decreased the odds of lost time (OR= 0.58; CI 95%= 0.31 – 0.83). In the second analysis, where high work support served as the reference group, results revealed that nurses and HCAs have an OR of almost 1.4 (OR= 1.36; CI 95%= 1.10 – 1.69) to go on sick leave due to low or no work support. Data from the thematic analysis revealed similar concerns. Participants indicated the importance of employer and collegial workplace support to the nurse or HCA's occupational well-being. Due to the demanding nature of the job, participants noted that workplace support is difficult to maintain, which could lead to burnout. Interestingly, the perceived lack of support was shown to elevate burnout rates and the overall quality of work life among nursing staff.[92-96] For example, a literature review on the quality of work life among nurses in Canada

and the United States determined that promoting a positive collegial environment within the workplace is a critical component to the well-being of the nursing employees.[94] Research on the employee-employer relationship also offers compelling evidence on its importance with respect to the nurse and HCA's well-being.[95-97] Furthermore, an Australian study revealed a significant association between the perceived safety climate and the level of supervisory support, which in turn, was associated with psychological distress and emotional exhaustion.[97]

Debriefing following critical events in the workplace is an important display of work support that was noted to be insufficient by focus group participants.[98] Participants expressed the importance of debriefing to the well-being of the nursing personnel. Evidence from the literature suggests that due to the fast-paced environment in the health care field, debriefing is not commonly exercised.[98] To this end, the level and type of leadership in the workplace plays an integral role in the safety climate of the workplace.[95,96,99,100] Comparable with the qualitative findings, a prospective study examining leadership and lost time determined that leadership styles that were mostly task-oriented (i.e., less staff supportive), whether the work demands were high or low, increased the odds of sickness absence.[95,96] Instead, clinical leaders who have strong relationships with their employees, irrespective of the work demand, decreased the odds of sickness absence.[95,96] This finding is particularly important based on the results of this investigation. Quantitatively, we determined that increased job demand increased the odds of sickness absence. From a qualitative stance, nurses and HCAs working in units such as pediatrics experienced a great deal of guilt, which in turn, leads to burnout and sick leaves. Thus, through effective leadership and improved communication including

debriefing, burnout due to low work support or occupational demand could be reduced and thus, reduce sickness absenteeism.

### 5.6 Staff Shortage: An Underlying Factor in the Occurrence of Sickness Absenteeism

Upon conceptualizing the results of this investigation, we discovered that staff shortage was linked to the manifestation of sickness absence in various ways. Staff shortage in the nursing population is a global issue with potentially harmful impact on the health system.[53,101,102] Research in nursing suggests that unplanned overtime or additional shifts is a common practice in some countries with adverse outcomes.[53,103,104] Jacobsen et al. (2002) indicated that the use of mandatory overtime was used almost exclusively during times of crisis.[104] However, it is presently used as a tool to manage staff shortage on a regular basis. Similar trends are likely to be facing the Canadian system.[105,106] According to the Canadian Nurses Association, nursing shortage could reach as high as the equivalent of 60,000 full-time nurses by 2022 if workplace policies or interventions remain deficient.[107] Furthermore, Canadian studies confirm the prominent reality of the nursing shortages across the country.[108,109] The authors cautioned that this issue was expected to continue as a result of several factors around supply and demand.[105,110] The authors also indicated that the consequence of this shortage creates an undesirable and stressful environment within the profession and its corresponding organization.[111]

Quantitatively, we could not find any studies that directly examined the relationship of staff shortage on sickness absenteeism. Likewise, participants from the focus group discussions did not explicitly indicate that working short-staffed increased the risk of sick leave, except from a geographical context, specifically working in

northeastern Ontario (i.e., limited connection between networks). However, through their explanation of other factors to which they attributed to sickness absence, staff shortage appeared to serve as a traceable antecedent. To this end, it is suggested that staff shortage could act as an underlying factor to the intricate influences associated with sickness absence.

### 5.6.1 Staff Shortage and Shift Work

As previously described in this section, self-care factors such as physical activity, proper eating, or sleeping, although not statistically correlated with sickness absence, were compounding factors that pose a threat on shift workers. When an organization is facing an employee shortage it might often lead to employees having to work unplanned overtime and working non-traditional shifts.[53,60,103,104,112-114] With this in mind, I postulate that staff shortage is an underlying factor that mediates the danger of shift work leading to sick time due to physical, emotional, and organizational reasons. The rationale stems from the findings of the qualitative study. In context, the reported anxiety towards being asked to return to work while off duty implicates the reoccurrence of this practice. Secondly, reports of guilt and working while sick to avoid unplanned scheduling also allude to a deficiency in staffing. Thirdly, reports of the body's inability to heal from shift work point to extended hours of work or working irregular hours, could in part, be attributed to staff shortage.[91] Finally, in the north, participants noted that unlike southern regions, the connectivity between health networks puts nursing staff at a disadvantage, as there are fewer employees who could cover shifts.

Research about staff shortage and shift work coincide with my findings. An American study discovered that almost 25% of the nursing sample (n= 567) worked over

50 hours per week, and were more likely to work consecutive days with limited rest between shifts and scheduled time off.[53] The authors also revealed that almost one in five nurses worked mandatory overtime. Likewise, a European study revealed that countries like Ireland, Poland, and England had nurses working shifts lasting longer than 12 hours.[103] Furthermore, the authors revealed that over 25% of nurses report working overtime, which adds threat to the quality of care provided by the nurse. Based on their findings, the authors cautioned about the use of overtime to mitigate staff shortages. Thus, longer shifts and overtime could have adverse effects on both the employee and the patient, which in turn was labeled as counterproductive.[103]

### 5.6.2 Staff Shortage, Physical/Mental Health, and Safety Climate

Findings from this investigation discovered a link between exposure, guilt, and staff shortage on sickness absence. Innately, exposure to contaminants like airway infections is common in health care settings, which affect nursing employees and could directly lead to sickness absence.[91] However, limited staffing was portrayed to increase the level of guilt, which in turn, subject some nursing employees to work while sick, which was alluded to earlier in this discussion as the term more commonly known as presenteeism.[115] Research on presenteeism confirms that staff shortage is one of its principal indicators.[115-119] Interestingly, presenteeism was also found to be associated with increased work demand and job burnout, which contribute to sickness absence.[61,80,104,120] In summary, it appears that due to shortages in staffing, nurses work even when sick out of guilt to prevent unplanned shifts, an issue which was described during the focus group session. However, with higher demands, their health could

worsen, or they may infect other nursing staff, which further contributes to the nursing shortage.

Reports of the body's inability to heal effectively due to shift work could be influenced by limited staffing where nursing staff face longer hours or unplanned shifts. Therefore, it is believed that experiencing fatigue and the occurrence of musculoskeletal pain or MSD are tied to the staffing shortage. Participants noted that failing to operate at a full capacity translates to working faster and harder, which reportedly compromises some safety techniques in tasks such as lifting and carrying. Therefore, it is unsurprising to find that perceived high occupational demand, fatigue, and musculoskeletal pain were all factors that were statistically predictive of sickness absence among nurses and HCAs. The conjecture that limited staffing has implications on work demand and fatigue is in accordance with research on staff shortage among nurses and HCAs.[68,121] Next to working overtime and shift work, a mixed-methods study confirmed that excessive work demand was a primary theme as to why nurses and HCAs leave the workplace, which in turn, reduces the staff load.[121] In addition to the physical demand and the experiencing of musculoskeletal pain as described above, the authors noted that there is an emotional factor that is also involved and that contributes to the nursing shortage.[121] My findings suggested that increased work demand increases the chance of burnout. Other variables that were not statistically associated with sickness absence in this investigation such as job satisfaction, job strain, and low decision latitude were shown to be associated with increased job burnout.[92,95,96] Interestingly, burnout and job dissatisfaction are also viewed as outcomes of staff shortage.[122,123]

Staff shortage could also be associated with the lack of support from the organization, whether from management or colleagues. Low work support in itself was also tied with burnout.[121] Interestingly, a supportive work environment was found to be related to sickness absence as evidenced by statistical findings derived from the meta-analysis and by way of thematic analysis. The insufficiency of staffing could disallow for collegial and managerial support, or time for debriefing, especially in settings that are susceptible to risky patient behaviours such as patient violence, or for debriefing in the event of critical incidents such as the death of a child. Thus, we inductively posit that staff shortage within the nursing population increases the risk of burnout due to high work demand, low job satisfaction, and limited support from the workplace including missed opportunities for debriefing. This assumption is noteworthy since improved leadership and work support was shown to decrease the risk of sickness absence, irrespective of workload.[95,96] Similarly, a Canadian study revealed that managerial support through empowerment reduced nursing turnover and increased job satisfaction and organizational commitment.[124]

### 5.6.3 Staff Shortage in Northeastern Ontario and Potential Implications

The shortage in nursing has great implications for the City of Greater Sudbury and northeastern Ontario at large in relation to its contributions to sickness absence. The absence of nursing personnel in northeastern Ontario was shown to decrease job satisfaction, which in turn, increases the intention of nurses to leave the workplace.[88] This is particularly important given that absenteeism might be serving as both a "cause" and an "effect" to the employee shortage and sickness absence.[6] In this investigation's fourth chapter, two subthemes were reported as northern-specific factors that might be

related to sickness absence. One is the danger of commuting to work, which may include driving to patients' homes to offer home care, and the other is the limited interconnectedness of health networks within the region. With this in mind, it is apparent that the nursing shortage serves as an underlying factor to both reported subthemes.

As described earlier, nursing staff, particularly HCAs, indicated that there is a degree of danger involved when providing home care to patients due to weather and road conditions in northeastern Ontario.[44] It is believed that staff shortage could add more risk to the job. With fewer workers, demand would likely increase and thus, HCAs could likely be required to travel greater distances to provide home care serves. This issue is of great importance given the notable decline of HCAs in northeastern Ontario, particularly in Sudbury due to a notable imbalance between exerted effort and level of reward.[123,125]

Participants described that in some southern regions of Ontario, health networks are interconnected compared to northern (northeastern) Ontario. They noted that in southern Ontario, nurses' names could be placed on alternate lists of connected hospitals in the event of being short-staffed. From the views of participants, there are fewer bodies to cover shifts when there is nursing shortage, leading to factors such as higher work demands and extended shifts. Some participants indicated that unlike the north, southern regions of Ontario have more success in finding nursing staff to cover shifts due to a larger network, which generates a large list of available nursing staff.

With nursing shortage appearing to be a prominent indicator of sickness absence in this study, some considerations are made in this section. It is important to note that these implications were not sought directly from this study, but rather from the literature after analyzing the qualitative data, to better understand the effects of the nursing

shortages in northern Ontario. Evidence suggests that the nursing shortage in northern Ontario could be due to the geographical dispersion,[126,127] which could be felt more in northern areas. One of the possible issues faced in the north is recruitment.[127] In context, it was reported that many of the students who complete their academic studies in the north move away upon graduation. Some of the possible factors could also be tied to weather and road conditions.[128] For instance, results revealed that commuting to placements in poor road conditions were seen as a challenge among nursing students in the north.[128] Thus, it is suggested that the staff shortage in the north could potentially have more profound effects on its employees than in the south for two reasons. Firstly, in addition to the global issues vis-à-vis the nursing shortage, the geographical uniqueness of northeastern Ontario adds greater challenges in terms of recruiting, retaining, and filling staff shortages. Secondly, as staff shortage is an underlying factor to many of the influences of sick time, there is evidence that absenteeism itself decreases job satisfaction and increases the nurse's intent to leave due to the various quality of work life characteristics.[88] With greater intentions to leave the workplace, staff shortage becomes more prominent and the deleterious cycle of absenteeism and staff shortage regenerates.

**5.7 Limitations**

While this study has promising implications, some limitations should be addressed. The first limitation is the associated concerns regarding the use of meta-analyses such as publication biases, quality assessments, and the use of observational studies rather than experimental designs in meta-analytic computations.[129,130] As indicated in the framework subsection of this discussion, finding experimental studies for the needs of this undertaking would not be plausible due to methodological and ethical

issues. Additionally, the use of observational studies in meta-analyses has been a widely accepted practice for the last two decades.[131] With respect to observational studies, many of the studies included were cross-sectional, which is a limitation given that the design cannot determine causal relationships between the independent and dependent variables.[132] As such, it is unknown if the identified risk factors were present before and/or after the health outcome of interest, and thus, it poses some limitations on the power of "prediction." Yet, excluding them also poses threat of neglecting potentially knowledgeable data. Furthermore, even if prediction could not be stated with great certainty, strong associations between various variables and sickness absence were discovered, which should not go unnoticed and could serve as a starting point to help reduce adverse risks in this population. Moreover, the use of the qualitative study in conjunction with the meta-analysis strengthens the findings of this investigation.

A usual statistical risk when running multiple analyses is Type I error (i.e., false positive). This problem might also arise when conducting subgroup analyses for meta-analytic computations. However, there is no unanimity on how to mitigate this issue in meta-analyses.[5] Results were considered through the commonly used criterion of statistical significance (i.e., $\alpha = 0.05$) and through a stricter criterion to meet level of significance (i.e., $\alpha = 0.01$).[5] Overall, most of the statistically significant factors had a 1% or lower probabilities of statistical significance due to chance. Specifically, mental health and increased job demands were the only variables that met significance at the 0.05 criterion while the remaining 16 statistically significant variables were met at 0.01 or lower. While considerations were made to lessen methodological biases and statistical errors that might have affect the presented results, results should be interpreted more with

considerations of their application rather solely on statistical significance. To this end, learning from the experiences of nursing staff and key informants helped remedy those statistical concerns.

Heterogeneity in meta-analytic studies is also another common limitation.[5,133] As the studies' participants varied in their characteristics (e.g., age, job duty, unit placement etc.), heterogeneity is a possibility. Thus, a random-effects model was deemed as the appropriate statistical computation. In contrast to its counterpart, the fixed-effect model, random-effects analysis undertakes that the true effect size differs from one study to the other.[5,133] Accordingly, further statistical computations were undertaken to measure heterogeneity by way of Cochrane $Q$ and the ratio of true dispersion to total observed variation (i.e., $I^2$).[30] Overall, 24 variables were assessed for heterogeneity of which 83% revealed low to no heterogeneity (i.e., $I^2 < 25\%$). Only one variable, (i.e., perceived poor health), was deemed as highly heterogeneous, and therefore this finding should be interpreted with a degree of caution. The remaining three variables (i.e., job strain, job satisfaction, and musculoskeletal pain) demonstrated moderate levels of heterogeneity. Two of those overall effects were not statistically associated with sickness absence. While the overall effect of the variable musculoskeletal pain was moderately heterogeneous ($I^2 = 35.03\%$), Cochrane $Q$ revealed it was not significantly heterogonous ($Q = 10.77$, $p = 0.22$). Importantly, all studies pooled in the analysis were statistically associated with sickness absence.[26-28,48-51] Furthermore, the qualitative study confirmed the magnitude of musculoskeletal pain on nursing staff. Moreover, a follow-up analysis of studies that only looked at back pain had low heterogeneity score ($I^2 = 8.82\%$) and statistically associated with sickness absence.

Thematic analysis was used for the qualitative portion of this study. While thematic analysis is commonly used in the analysis of focus groups, some methodological limitations and their solutions are addressed. For instance, the representativeness of the participants could be of some concern. Participants from the focus groups were all employees working in the City of Greater Sudbury. Thus, the transferability or the ability to generalize beyond this group towards the factors affecting northeastern Ontario as a whole should be made cautiously.[134] It is understood that northeastern Ontario might share similar challenges. However, the degree of impact might vary based on each northern community's needs and unique characteristics. Nevertheless, to our knowledge, this qualitative study is one of the first to thoroughly examine sickness absence among nursing staff from northeastern Ontario.

The credibility, which is the study's internal validity, is of great importance of for future work on nursing staff in northeastern Ontario and the profession at large.[134,135] It is believed that the study's findings were fairly credible for several reasons. First, despite the diversity among the recruited participants, there were consistencies among themes. Not only did their job titles vary, but they also worked in different units or organizations. Furthermore, the results of the thematic analysis complimented the results from the meta-analyses. In context, the studies pooled for analyses were obtained from various regions around the world. Furthermore, upon completing data analysis and the reporting of the themes from this study, an additional check was completed to ensure that textual data were not misconstrued. This was done reviewing the transcripts and seeking any misleading or contradictory statements. Similar to other thematic analyses, dependability, which refers to the reliability of the findings, could be of limitation.[134,135]

However, we provided detailed disclosure with respect to methodological procedures including recruitment and analysis to increase the study's transparency.

**5.8 Future Direction**

"Ideally," employers would be able to hire and maintain a complement of staff with higher wages, which would reduce high demands and extended hours, and avoid poor health outcomes translated into sickness absence. However, with a health system that is fiscally constrained, such recommendation would be challenging, if not unrealistic to achieve. As a result, more feasible recommendations are required. This investigation serves as a stepping-stone in supporting nurses and HCAs by understanding the occurrence of sickness absence. Through this evidence-based approach, follow-up studies can be undertaken to further explore the interactions between variables among nursing staff. Additionally, it allows for the possibility of constructing a psychometric tool, which could help predict sickness absence.

The application of predictive tools in the social sciences is not a novel concept. For instance, through meta-analytic methods, a tool known as the Static-99 demonstrates the power of prediction in the forensic field, specifically with recidivism among sex offenders.[7] Forensic psychologists commonly use this tool in court-ordered or correctional psychological assessments. In fact, evidence suggests that actuarial tools in that field are considered to be superior to traditional or "subjective" clinical assessments for both diagnostic and prognostic efforts.[136] Based on the findings of this study, it would appear that sickness absence could, to some degree, be predicted. Through the construction of a psychometric tool, and its administration by trained professionals in the area of risk assessment and psychometrics, a better understanding of the nursing

employee's level of risk would be determined. In doing so, appropriate supports could be identified and thereby, sick leave could then be reduced or prevented. Naturally, this might have considerable favourable health implications on nursing staff and could maintain the safety of the patients they care for. It also has promising financial implications to employers and to the overall health system that is presently faced with alarmingly high rates of job turnover and occupational injuries.

In the Canadian system, unions play a major role in protecting their employees and strive to improve their members' working conditions.[137-139] To this end, it is recommended that unions working to protect nursing employees would consider the utilization of such risk assessment once the tool is completed and validated, through their collective bargaining. As an example, unions could use this tool to assess their employees' level of risk. Next, they can request, through the power of the collective agreement to offer specialized services that are tailored to the needs of the nursing employees through their Employee Assistance Program (EAP). In doing so, it is believed that this is a proactive and a preventative method to support employees who would be considered to be at risk of sickness absenteeism. It is important to note that the utilization of a predictive tool is not intended to decide the outcome of the employee in terms of wages or potential hiring or firing. Instead, it is intended to further support the employee.

Results of this study highlight the impact of staff shortage on nurses and HCAs, especially in northeastern Ontario. While recruitment initiatives should be put in place, we recommend that employers and policymakers should put more focus towards supporting current nursing personnel since there is evidence that the factors associated with sick leave are similar to those for intention to leave.[7] In context, there should be

more work support and empowerment from the managerial staff, which would decrease burnout and thus, sickness absence.[124] Based on the findings of this study, a more supportive approach from management by improved communication to learn about the nursing staff's unit, patients, and potential personal factors (e.g., feeling unwell) could foster a better working environment. Through improved relationships, leaders could better assess the health and performance of their staff, and potentially recognize and prevent antecedents of sickness absence. This could be done by having routinely scheduled clinical supervisions in a one-to-one or in group formats with staff members to discuss issues at work and ensure that each employee is feeling supported. Routine supervision was shown to increase the nursing employee's well-being.[140] Additionally, it allows for better debriefing when difficult situations occur. Evidence from the literature suggests that debriefing can be a powerful tool. Specifically, it would improve team cohesion. Furthermore, it would allow for better review the team's performance and offer learning opportunities. Finally, debrief on recent events might help prevent future problems based on recent events.[140] In addition to frequent supervision, employers and policymakers should invest in leadership programs for managerial nurses. Such programs could help managerial staff to offer effective supports for the nursing staff. Supports to nursing students should also be considered. By carefully monitoring, mentoring, and educating students on the safety aspects of the workplace, they can help develop skills to prevent injuries and be aware of services available to them. In fact, it might be helpful to assess the risk of sick leave in the student population to better inform and protect future employees.

As described from the qualitative study, some minor aches could turn into chronic pain or MSD. Therefore, earlier detection and reporting of musculoskeletal pain could help reduce the risk of chronic pain. In doing so and if feasible, the nursing employee's duties could then be temporarily modified to prevent conditions from becoming more chronic. By extension, employers and policy makers should consider the risks involved with nursing staff working extended shifts or unplanned schedules with limited rest in between shifts. Accordingly, employers might consider the utilization of modified duty lists in the event of extended hours that focus on the levels of importance and urgency. Also, it is recommended that a comprehensive needs assessment be completed when a nursing staff files a disability claim. This assessment would help to discover "the root" of the problem, which in turn, would allow for more appropriate treatment and a quicker return to work.

This study allowed for nursing staff and key informants to offer their input with workplace matters, specifically sickness absence. While this study offered insightful information on the factors associated with sickness absence and how they may evolve, it is felt that this is merely a "first step" towards finding means to keep nurses and HCAs healthy and able to return to work. In context, further discussions with nursing personnel and key informants along with policy makers should take place to collaboratively find practical solutions to minimize the risks associated with sickness absence.

Concerning research, future studies should include more qualitative studies similar to the structure used in this study. Focus group sessions held in various regions could help identify local factors that could increase the likelihood of sick leave. From a geographical perspective, more representation of northeastern Ontario is required to help

gain a better estimate of the risks involved in the region. This is especially important given the dearth in literature regarding sickness absence in northeastern Ontario. Further research could also compare the antecedents of sickness absence between rurality and urban cities both in northern and southern regions of Ontario to help inform employers and the broader health system.

**5.9 Conclusion**

Nurses and HCAs have the highest rates of sickness absence in Canada[41]. Results of this investigation suggest that factors associated with sickness absence among the nursing profession are multifaceted, interconnected, and difficult to manage. Meta-analytically, a number of health, personal, and organizational factors were found to increase or decrease the odds of sickness absence. Qualitative findings helped add to those factors and offer a deeper understanding on the occurrence of sickness absence, with considerations to northeastern Ontario.

Upon conceptualizing the results of all three chapters along with further consultation of the literature, a conceptual model was created, which highlighted the impact of staff shortage on sickness absenteeism among the nursing population. Staff shortage has direct impact on nursing staff working in northeastern Ontario due to the limited connection between networks, which would allow for more effective coverage. Furthermore, it is suspected that staff shortage has impact on the employee's job satisfaction, their susceptibility to high job strain, and their ability to look after their self-care needs. While these specific variables were not found to have statistical impact on sickness absence, it is believed that the outcomes of such variables could still have an effect on sickness absence, but viewed in a different form. For instance, a poor lifestyle

due to lack of extended work could by why shift work was found to increase sickness absence.

The findings of this study suggest that despite the interconnection between the variables associated with sickness absence, sickness absence could to some degree be predicted. To this end, future research should focus on the construction of a risk assessment tool used to help better understand the needs of each employee and offer supports that are tailored to individualistic needs through programs advocated by unions within EAPs. Other considerations include more and improved leadership presence with proper debriefing, duty modifications based on staff shortage or on mild pains reported by the employees, and more detailed needs assessment following disability claims.

## References


1. Briner RB. Developing evidence-based occupational health psychology. In: Houdmont J, Leka S, Sinclair RR, eds. *Contemporary Occupational Health Psychology*. *Global Perspectives on Research and Practice*, Volume 2. Chichester, UK: John Wiley & Sons; 2012:36-56. doi:10.1002/9781119942849.ch3.

2. MacPhee M, Pratt P. Evidence-based practice. *Journal of Pediatric Nursing Care of Children and Families*. 2005;20(5):396-398. doi:10.1016/j.pedn.2005.03.015.

3. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: What it is and what it isn't. *BMJ*. 1996;312(7023):71-72. doi:10.1136/bmj.312.7023.71.

4. Mantzoukas S. A review of evidence□based practice, nursing research and reflection: levelling the hierarchy. *J Clin Nurs.* 2008;17(2):214-223. doi:10.1111/j.1365-2702.2006.01912.x.

5. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. *Introduction to Meta-Analysis*. Chichester, UK: John Wiley & Sons; 2009. doi:10.1002/9780470743386.

6. Chan ZCY, Tam WS, Lung MKY, Wong WY, Chau CW. A systematic literature review of nurse shortage and the intention to leave. *J Nurs Manag.* 2013;21(4):605-613. doi:10.1111/j.1365-2834.2012.01437.x.

7. Josephson M, Lindberg P, Voss M, Alfredsson L, Vingard E. The same factors influence job turnover and long spells of sick leave--a 3-year follow-up of Swedish nurses. *Eur J Public Health.* 2008;18(4):380-385. doi:10.1093/eurpub/ ckn009.

8. Stone PW, Gershon RRM. Nurse work environments and occupational safety in intensive care units. *J Nurs Administ*. 2009;39(Supplement):S27-S34. doi:10.1097/NNA.0b013e3181aeb49e.

9. Ferrie JE, Vahtera J, Kivimaki M, et al. Diagnosis-specific sickness absence and all-cause mortality in the GAZEL study. *J Epidemiol Community Health.* 2009;63(1):50-

55. doi:10.1136/jech.2008.074369.

10. Hanson RK, Bussiere MT. Predicting relapse: a meta-analysis of sexual offender recidivism studies. *J Consult Clin Psychol.* 1998;66(2):1-15.

11. Head J, Ferrie JE, Alexanderson K, Westerlund H, Vahtera J, Kivimaki M. Diagnosis-specific sickness absence as a predictor of mortality: the Whitehall II prospective cohort study. *BMJ*. 2008;337:a1469. doi:10.1136/ bmj.a1469.

12. Kivimäki M, Ferrie JE, Hagberg J, et al. Diagnosis-specific sick leave as a risk marker for disability pension in a Swedish population. *J Epidemiol Community Health.* 2007;61(10):915-920. doi:10.1136/jech.2006.055426.

13. Roelen CAM, Koopmans PC, Schreuder JAH, Anema JR, van der Beek AJ. The history of registered sickness absence predicts future sickness absence. *Occup Med*. 2011;61(2):96-101. doi:10.1093/occmed/kqq181.

14. Vahtera J, Westerlund H, Ferrie JE, et al. All-cause and diagnosis-specific sickness absence as a predictor of sustained suboptimal health: a 14-year follow-up in the GAZEL cohort. *J Epidemiol Community Health.* 2010;64(4):311-317. doi:10.1136/jech.2008.083923.

15. Hatch DJ, Freude G, Martus P, Rose U, Müller G, Potter GG. Age, burnout and physical and psychological work ability among nurses. *Occup Med*. 2018;68(4):246-254. doi:10.1093/occmed/kqy033.

16. Statistics Canada. *Census Metropolitan Area: Ontario. Labour & Employment*. Ottawa, ON: Statistics Canada; June 2015:1-3.

17. Meadus RJ, Twomey JC. Men student nurses: the nursing education experience. *Nurs Forum*. 2011;46(4):269-279. doi:10.1111/j.1744-6198.2011.00239.x.

18. Barmby TA, Ercolani MG, Treble JG. Sickness absence: an international comparison. *Econ J.* 2002;112(480):F315-F331. doi:10.1111/1468-0297.00046.

19. Khawaja RA, Sikander R, Khawaja AA, Jareno RJ. Medically certified sickness absence among health care workers. *J Pak Med Assoc.* 2012;62(9)900-904.

20. Krantz G, Östergren P-O. Do common symptoms in women predict long spells of sickness absence? A prospective community-based study on Swedish women 40 to 50 years of age. *Scand J Public Health*. 2002;30(3):176-183. doi:10.108 0/14034940210133816.

21. Laaksonen M, Martikainen P, Rahkonen O, Lahelma E. Explanations for gender differences in sickness absence: evidence from middle-aged municipal employees from Finland. *Occup Med*. 2008;65(5):325-330. doi:10.1136/oem.2007.03 3910.

22. Laaksonen M, Mastekaasa A, Martikainen P. Gender differences in sickness absence-the contribution of occupation and workplace. *Scand J Work Environ Health.* 2010;36(5):394-403. doi:10.5271/sjweh.2909.

23. Tuckett A, Henwood T, Oliffe JL, Kolbe-Alexander TL, Kim JR. A comparative study of Australian and New Zealand male and female nurses' health. *Am J Mens Health.* 2016;10(6):450-458. doi:10.1177/1557988314567222.

24. Gorman JM. Gender differences in depression and response to psychotropic medication. *Gend Med.* 2006;3(2):93-109.

25. Alexopoulos EC, Tanagra D, Detorakis I, et al. Knee and low back complaints in professional hospital nurses: occurrence, chronicity, care seeking and absenteeism. *Work*. 2011;38(4):329-335. doi:10.3233/WOR-2011-1136.

26. Eriksen W. Work factors as predictors of intense or disabling low back pain; a prospective study of nurses' aides. *Occup Med*. 2004;61(5):398-404. doi: 10.1136/oem.2003.008482.

27. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence: a three month prospective study of nurses' aides. *Occup Med*. 2003;60(4):271-278.

28. Ferreira RC, Griep RH, Fonseca M. A multifactorial approach to sickness absenteeism among nursing staff. *Revista Saúde Pública*. 2012;46(2):1-9.

29. Nilsson A, Lindberg P, Denison E. Predicting of pain, disability, and sick leave regarding a non-clinical sample among Swedish nurses. *Scand J Pain.* 2010;1(3):160-166. doi:10.1016/j.sjpain.2010.05.029.

30. Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ*. 2003;327(7414):557-560. doi:10.1136/bmj.327.74 14.557.

31. Franche R-L, Murray E, Ibrahim S, et al. Examining the impact of worker and workplace factors on prolonged work absences among Canadian nurses. *J Occup Environ Med.* 2011;53(8):919-927. doi:10.1097/JO M.0b013e3182255dea.

32. Pompeii LA, Lipscomb HJ, Schoenfisch AL, Dement JM. Musculoskeletal injuries resulting from patient handling tasks among hospital workers. *Am J Ind Med.* 2009;52(7):571-578. doi:10.1002/ajim.20704.

33. Miranda H, Punnett L, Gore R, Boyer J. Violence at the workplace increases the risk of musculoskeletal pain among nursing home workers. *Occup Environ Med.* 2011;68(1):52-57 doi: 10.1136/oem.2009.051474

34. Alexander C, Fraser J. Occupational violence in an Australian health care setting: implications for managers. *J Healthc Manag.* 2004;49(6):377-390. doi:10.1097/00115514-200411000-00007.

35. Åström S, KARLSSON S, Sandvide Å, et al. Staff's experience of and the management of violent incidents in elderly care. *Scand J Caring Sci.* 2004;18(4):410-416. doi:10.1111/j.1471-6712.2004.00301.x.

36. Estryn-Behar M, van der Heijden B, Camerino D, et al. Violence risks in nursing–results from the European "NEXT" Study. *Occup Med*. 2008;58(2):107-114. doi:10.1093/occmed/kqm142.

37. Hahn S, Muller M, Needham I, Dassen T, Kok G, Halfens RJ. Factors associated with

patient and visitor violence experienced by nurses in general hospitals in Switzerland: a cross□sectional survey. *J Clin Nurs.* 2010;19(23□24):3535-3546. doi:10.1111/j.1365-2702.2010.03361.x.

38. Eriksen W, Tambs K, Knardahl S. Work factors and psychological distress in nurses' aides: a prospective cohort study. *BMC Public Health*. 2006;6(1):290-511. doi:10.11 86/1471-2458-6-290

39. Gong Y, Han T, Yin X, et al. Prevalence of depressive symptoms and work-related risk factors among nurses in public hospitals in southern China: a cross-sectional study. *Sci Rep.* 2014;4:7109. doi:10.1038/srep07109.

40. Jolivet A, Caroly S, Ehlinger V, et al. Linking hospital workers' organisational work environment to depressive symptoms: a mediating effect of effort–reward imbalance? The ORSOSA study. *Soc Sci Med.* 2010;71(3):534-540. doi:10.1016/j.socscimed.2010.04.003.

41. Dabboussy M, Uppal S. Work absences in 2011. *Statistics Canada Catalogue no. 75-001-X Perspectives on Labour and Income*. Ottawa, ON: Statistics Canada;March 2012:1-11.

42. Ontario Personal Support Workers. *Personal Support Workers: Fact Sheet*. Ontario Personal Support Network; June 2014:1-3.

43. Bulgari V, Ferrari C, Pagnini F, de Girolamo G, Iozzino L. Aggression in mental health residential facilities: a systematic review and meta-analysis. *Aggress Violent Behav.* 2018;41:119-127. doi:10.1016/j.avb.2018.06.002.

44. Skinner MW, Yantzi NM, Rosenberg MW. Neither rain nor hail nor sleet nor snow: provider perspectives on the challenges of weather for home and community care. *Soc Sci Med.* 2009;68(4):682-688. doi:10.1016/j.socscimed.2008.11.02 2.

45. Local Health Integration Network. *Integrated Health Service Plan 2013-2016*. Local Health Integration Network; November 2012:1-402.

46. North East Local Health Integration Network. *North East Local Health Integration Network: Population Health Profile*. North East Local Health Integration Network September 2012:1-4.

47. North West Local Health Integration Network. *North West Local Health Integration Network: Population Health Profile.* North West Local Health Integration Network; January 2013:1-4.

48. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence attributed to airway infections: a three month prospective study of nurses' aides. *Occup Med*. 2004;61(1):45-51. doi:10.2307/27732152

49. Horneij EL, Jensen IB, Holmström EB, Ekdahl C. Sick leave among home-care personnel: a longitudinal study of risk factors. *BMC Musculoskelet Disord.* 2004;5(1):9. doi:10.1186/1471-2474-5-38.

50. Jensen JN, Karpatschof B, Labriola M, Albertsen K. Do fear-avoidance beliefs play a role on the association between low back pain and sickness absence? A prospective cohort study among female health care workers. *J Occup Environ Med.* 2010;52(1):85-90. doi:10.1097/JOM.0b013e3181c95b9e.

51. Smedley J, Egger P, Cooper C, Coggon D. Prospective cohort study of predictors of incident low back pain in nurses. *BMJ.* 1997;314(7089):1225-1225. doi:10.1136/bmj.314.7089.1225.

52. Smith DR, Wei N, Zhao L, Wang R-S. Musculoskeletal complaints and psychosocial risk factors among Chinese hospital nurses. *Occup Med*. 2004;54(8):579-582. doi:10.1093/occmed/kqh117.

53. Trinkoff AM, Le R, Geiger-Brown J, Lipscomb J, Lang G. Longitudinal relationship of work hours, mandatory overtime, and on□call to musculoskeletal problems in nurses. *Am J Ind Med.* 2006;49(11):964-971. doi:10.1002/ ajim.20330.

54. de Castro AB. Barriers to reporting a workplace injury: Recognizing the difficulties

and encouraging a determined approach. *Am J Nurs*. 2003;103 (8):112. doi:10.1097/01.NAJ.0000534830.87856.56.

55. Menzel N. Back pain prevalence in nursing personnel: measurement issues. *Workplace Health Saf.* 2004;52(2):54-65. doi:10.1177/216507990405200204.

56. Elstad JI, Vabø M. Job stress, sickness absence and sickness presenteeism in Nordic elderly care. *Scand J Soc Med.* 2008;36(5):467-474. doi:10.1 177/1403494808089557.

57. Pompeii LA, Lipscomb HJ, Dement JM. Predictors of lost time from work among nursing personnel who sought treatment for back pain. *Work.* 2010;37(3):285-295. doi:10.3233/WOR-2010-1080.

58. Koolhaas W, van der Klink JJL, de Boer MR, Groothoff JW, Brouwer S. Chronic health conditions and work ability in the ageing workforce: the impact of work conditions, psychosocial factors and perceived health. *Int Arch Occup Environ Health.* 2013;87(4):433-443. doi:10.1007/s00420-013-0882-9.

59. Lipscomb JA, Trinkoff AM, Geiger-Brown J, Brady B. Work-schedule characteristics and reported musculoskeletal disorders of registered nurses. *Scand J W Environ Health*. 2002;28(6):394-401. doi:10.5271/sjweh.691.

60. Geiger-Brown J, Muntaner C, Lipscomb J, Trinkoff A. Demanding work schedules and mental health in nursing assistants working in nursing homes. *Work Stress*. 2004;18(4):292-304. doi:10.1080/02678370412331320044.

61. Stimpfel AW, Sloane DM, Aiken LH. The longer the shifts for hospital nurses, the higher the levels of burnout and patient dissatisfaction. *Health Aff.* 2012;31 (11):2501-2509. doi:10.1377/hlthaff.2011.1377.

62. Jordan G, Nowrouzi-Kia B, Gohar B, Nowrouzi B. Lost-time illness, injury and disability and its relationship with obesity in the workplace: a comprehensive literature review. *Saf Health Work.* 2016;29(5):749-766. doi:10.1016/ j.shaw.2014.12.006.

63. Nowrouzi B, Gohar B, Nowrouzi-Kia B, et al. Lost-time illness, injury and disability and its relationship with obesity in the workplace: a comprehensive literature review. *Int J Occup Med Environ Health.* 2016;29(5):749-766. doi:10.13075/ijomeh.1896.00725.

64. Siqueria K, Griep R, Rotenberg L, Silva-Costa A, Mendes da Fonseca M de J. Weight gain and body mass index following change from daytime to night shift – a panel study with nursing professionals. *Chronobiol Int*. 2016;33(6):776-779. doi:10.3109/07420528.2016.1167719.

65. Kamdar BB, Tergas AI, Mateen FJ, Bhayani NH, Oh J. Night-shift work and risk of breast cancer: a systematic review and meta-analysis. *Breast Cancer Res Treat.* 2013;138(1):291-301. doi:10.1007/s10549-013-2433-1.

66. Schernhammer ES, Laden F, Speizer FE, et al. Night-shift work and risk of colorectal cancer in the Nurses' Health Study. *J Natl Cancer Inst.* 2003;95 (11):825-828. doi:10.1093/jnci/95.11.825.

67. Viswanathan AN, Hankinson SE, Schernhammer ES. Night shift work and the risk of endometrial cancer. *Cancer Res.* 2007;67(21):10618-10622. doi:10.1158/00 08-5472.CAN-07-2485.r

68. Geiger-Brown J, Rogers VE, Trinkoff AM, Kane RL, Bausell RB, Scharf SM. Sleep, sleepiness, fatigue, and performance of 12-hour-shift nurses. *Chronobiol Int.* 2012;29(2):211-219. doi:10.3109/07420528.2011.645752.

69. Aisbett B, Condo D, Zacharewicz E, Lamon S. The Impact of shiftwork on skeletal muscle health. *Nutrients*. 2017;9(3):248–16. doi:10.3390/nu9030248.

70. Samaha E, Lal S, Samaha N, Wyndham J. Psychological, lifestyle and coping contributors to chronic fatigue in shift-worker nurses. *J Adv Nurs.* 2007;59(3):221-232. doi:10.1111/j.1365-2648.2007.04338.x.

71. Gates DM, Ross CS, McQueen L. Violence against emergency department workers. *J Emerg Med.* 2006;31(3):331-337. doi:10.1016/j.jemermed.2005.1 2.028.

72. Adwan JZ. Pediatric nurses' grief experience, burnout and job satisfaction. *J Pediatr Nurs.* 2014;29(4):329-336. doi:10.1016/j.pedn.2014.01.011.

73. Brown C, Wood A. Oncology nurses' grief: a literature review. *Clin J Oncol Nurs.* 2009;13(6):625-627. doi:10.1188/09.cjon.625-627.

74. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol.* 2001;52(1):397-422. doi:10.1146/annurev.psych.52.1.397.

75. Mearns KJ, Flin R. Assessing the state of organizational safety—culture or climate? *Curr Psychol.* 1999;18(1):5-17. doi:10.1007/s12144-999-1013-3.

76. Karasek RA. Job demands, job decision latitude, and mental strain: implications for job redesign. *Adm Sci Q.* 1979;24(2):285. doi:10.2307/239 2498.

77. Ando S, Ono Y, Shimaoka M, et al. Associations of self estimated workloads with musculoskeletal symptoms among hospital nurses. *Occup Environ Med*. 2000;57 (3):211-216. doi:10.1136/oem.57.3.211.

78. Bernal D, Campos-Serna J, Tobia A, Vargas-Prada S, Benavides FG, Serra C. Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: a systematic review and meta-analysis. *Int J Nurs Stud.* . 2015;52(2):635-648.

79. Daraish N, Genaidy AM, Karwowski W, Davis LS, Stambough J, Huston RL. Musculoskeletal outcomes in multiple body regions and work effects among nurses: the effects of stressful and stimulating working conditions. *Ergonomics*. 2003;46(12):1178-1199. doi:10.1080/0014013031000139509.

80. Demerouti E, Le Blanc PM, Bakker AB, Schaufeli WB, Hox J. Present but sick: a three□wave study on job demands, presenteeism and burnout. *Career Dev Int*. 2013;14(1):50-68. doi:10.1108/13620430910933574.

81. Raithatha AS, Mishra DG. Musculoskeletal disorders and perceived work demands among female nurses at a tertiary care hospital in India. *Int J Chronic Dis.*

2016:ID5038381:1-6. doi:10.1155/2016/5038381.

82. Sundin L, Hochwälder J, Lisspers J. A longitudinal examination of generic and occupational specific job demands, and work-related social support associated with burnout among nurses in Sweden. *Work*. 2011;38(4):389-400. doi:10.3233/WOR-2011-1142.

83. Bernal D, Campos-Serna J, Tobias A, Vargas-Prada S, Benavides F, Serra C. Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: a systematic review and meta-analysis. *Int J Nurs Stud.* 2015;52(2):635.

84. Bourbonnais R, Mondor M. Job strain and sickness absence among nurses in the province of Quebec. *Am J Ind Med.* 2001;39(2):194-202. doi:10.1002/1097-0274(200102)39.

85. Hussami Al M, Darawad M, Saleh A, Hayajneh FA. Predicting nurses' turnover intentions by demographic characteristics, perception of health, quality of work attitudes. *Int J Nurs Pract.* 2014;20(1):79-88.

86. Cohen A, Golan R. Predicting absenteeism and turnover intentions by past absenteeism and work attitudes: an empirical examination of female employees in long term nursing care facilities. *Career Dev Int.* 2007;12 (5):416-432.

87. Nantsupawat A, Kunaviktikul W, Nantsupawat R, Wichaikhum OA, Thienthong H, Poghosyan L. Effects of nurse work environment on job dissatisfaction, burnout, intention to leave. *Int Nurs Rev.* 2017;64(1):91-98. doi:10.1111/inr.1 2342.

88. Nowrouzi B, Lightfoot N, Carter L, Larivère M, Rukholm E, Belanger-Gardner D. Workplace system factors of obstetric nurses in northeastern Ontario, Canada: using a work disability prevention approach. *Saf Health Work.* 2015;6(4):305-311. doi:10.1016/j.shaw.2015.07.004.

89. Ogresta J, Rusac S, Zorec L. Relation between burnout syndrome and job satisfaction among mental health workers. *Croat Med J.* 2008;49(3):364-374. doi:10.3325/cmj.2008.3.364.

90. Sourdif J. Predictors of nurses' intent to stay at work in a university health center. *Nurs Health Sci.* 2004;6(1):59-68.

91. Barker J, Stevens D, Bloomfield SF. Spread and prevention of some common viral infections in community facilities and domestic homes. *J Appl Microbiol.* 2001;91(1):7-21. doi:10.1046/j.1365-2672.2001.01364.x.

92. Anagnostopoulos F, Niakas D. Job burnout, health-related quality of life, and sickness absence in Greek health professionals. *Eur Psychol.* 2010;15(2):132-141. doi:10.1027/1016-9040/a000013.

93. Armstrong K, Laschinger H, Wong C. Workplace Empowerment and magnet hospital characteristics as predictors of patient safety climate. *J Nurs Care Qual*. 2009;24(1):55-62. doi:10.1097/NCQ.0b013e31818f5506.

94. Nowrouzi B, Giddens E, Gohar B, Schoenenberger S, Bautista MC, Casole J. The quality of work life of registered nurses in Canada and the United States: a comprehensive literature review. *Int. J Occup Med Environ Health*. 2016;22(4):341-358. doi:10.1080/10773525.2016.1241920.

95. Schreuder JAH, Roelen CAM, van Zweeden NF, Jongsma D, van der Klink JJL, Groothoff JW. Leadership styles of nurse managers and registered sickness absence among their nursing staff. *Health Care Manage Rev.* 2011;36(1):58-66. doi:10.1097/HMR.0b013e3181edd96b.

96. Schreuder JA, Roelen CA, van Zweeden NF, Jongsma D. Leadership effectiveness and recorded sickness absence among nursing staff: a cross-sectional pilot study. *J Nurs Manag*. 2011;19(5)585-95 doi:10.1111/j.1365-2834.2010.01198.x.

97. Dollard MF, Opie T, Lenthall S, et al. Psychosocial safety climate as an antecedent of work characteristics and psychological strain: a multilevel model. *Work Stress*. 2012;26(4):385-404. doi:10.1080/02678373.2012.734154.

98. Healy S, Tyrrell M. Importance of debriefing following critical incidents.

*Emerg Nurse.* 2013;20(10):32-37. doi:10.7748/en2013.03.20.10.32.s8.

99. Zohar D. Thirty years of safety climate research: reflections and future directions. *Accid Anal Prev.* 2010;42(5):1517-1522. doi:10.1016/j.aap.2009.12.0 19.

100. Zohar D. The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. *J Organ Behav*. 2002;23(1):75-92. doi:10.1002/job.130.

101. Duffield C, O'Brien-Pallas L. The causes and consequences of nursing shortages: a helicopter view of the research. *Aust Health Rev.* 2003;26(1):186-193. doi: 10.1071/ah030186.

102. Oulton JA. The global nursing shortage: an overview of issues and actions. *Policy Polit Nurs Pract.* 2016;7(3s):34S–39S. doi:10.1177/1527154406293968.

103. Griffiths P, Dall'Ora C, Simon M, et al. Nurses' Shift length and overtime working in 12 European countries. *Med Care.* 2014;52(11):975-981. doi:10.1097/mlr.00000 00000000233.

104. Jacobsen C, Holson D, Farley J, Charles J, Suel P. Surviving the perfect storm: staff perceptions of mandatory overtime. *JONAS Healthc Law Ethics Regul*. 2002;4(3):57. doi:10.1097/01.NHL.0000277200.09240.1e.

105. Basu K, Gupta A. Nursing shortages: where and why. *Health Policy Research Bulletin*. 2007;(13):21-25.

106. MacKinnon K, Butcher DL, Bruce A. Working to full scope: The reorganization of nursing work in two Canadian community hospitals. *Glob Qual Nurs Res.* 2018;5(1):233339361775390–14. doi:10.1177/2333393617753905.

107. Canadian Nurses Association. Nursing Shortage. Retrieved from: https://www.cna-aiic.ca/en/news-room/news-releases/2009/eliminating-canadas-rn-shortage

108. O'Brien-Pallas L, Murphy GT, Shamian J, Li X, Hayes LJ. Impact and determinants

of nurse turnover: a pan-Canadian study. *J Nurs Manag.* 2010;18(8):1073-1086. doi:10.1111/j.1365-2834.2010.01167.x.

109. O'Brien-Pallas LL, Doran DI, Nursing MM, 2001. Evaluation of a client care delivery model, part 1: variability in nursing utilization in community home nursing. *Nurs Econ.* 2001;19(6):267-276.

110. Rajbhandary S, Basu K. Working conditions of nurses and absenteeism: Is there a relationship? An empirical analysis using National Survey of the Work and Health of Nurses. *Health Policy*. 2010;97(2-3):152-159. doi:10.1016/j.healthpol.2010.04.010.

111. Greenslade M, Paddock K. *W*orking conditions of nurses: a cause for concern. *Health Policy Research Bulletin*; 2007;13:1-46.

112. Borda RG, Norman IJ. Factors influencing turnover and absence of nurses: a research review. *Int J Nurs Stud.* 1997;34(6):385-394. doi:10.1016/s0020-7489(97)00031-x.

113. Dall'Ora C, Griffiths P, Ball J, Simon M, Aiken LH. Association of 12 h shifts and nurses' job satisfaction, burnout and intention to leave: findings from a cross-sectional study of 12 European countries. *BMJ Open.* 2015;5(9):e008331-e008337. doi:10.1136/bmjopen-2015-008331.

114. Trinkoff AM, Le R, Geiger-Brown J, Lipscomb J. Work schedule, needle use, and needlestick injuries among registered nurses. *Infect Control Hosp Epidemiol.* 2007;28(2):156-164. doi:10.1086/51078 5.

115. Aronsson G. Sick but yet at work. An empirical study of sickness presenteeism. *J Epidemiol Community Health.* 2000;54(7):502-509. doi:10.1136/jec h.54.7.502.

116. Aronsson G, Gustafsson K. Sickness presenteeism: prevalence, attendance-pressure factors, and an outline of a model for research. *J Occup Environ Med.* 2005;47(9):958-966. doi:10.1097/01.jom.0000177219.756 77.17.

117. Johns G. Presenteeism in the workplace: a review and research agenda. *J Organ*

*Behav*. 2009;31(4):519-542. doi:10.1002/job.630.

118. Krane L, Larsen EL, Nielsen CV, Stapelfeldt CM, Johnsen R, Risør MB. Attitudes towards sickness absence and sickness presenteeism in health and care sectors in Norway and Denmark: a qualitative study. *BMC Public Health*. 2014;14(1):867–13. doi:10.1186/1471-2458-14-880.

119. Quazi H. Why do employees go to work despite being sick? An exploratory study in Singapore. In: SpringerLink; 2013:114-143. doi:10.1057/9781137275677.0011.

120. Martinez LF, Ferreira AI. Sick at work: presenteeism among nurses in a Portuguese public hospital. *Stress Health*. 2012;28(4):297-304. doi:10.1002/smi.1432.

121. Geiger-Brown J, Trinkoff AM, Aaohn KN, 2004. Nurses' perception of their work environment, health, and well-being: a qualitative perspective. *Workplace Health Saf.* 2004;52(1):16-22. doi:10.1177/216507990405200108.

122. McHugh MD, Kutney-Lee A, Cimiotti JP, Sloane DM, Aiken LH. Nurses' widespread job dissatisfaction, burnout, and frustration with health benefits signal problems for patient care. *Health Aff*. 2011;30(2):202-210. doi:10.1377/hlthaff.2010.0100.

123. McHugh MD, Ma C. Wage, Work environment, and staffing: effects on nurse outcomes. *Policy Polit Nurs Pract*. 2015;15(3-4):72-80. doi:10.1177/1527154414546868.

124. Spence Laschinger HK, Leiter M, Day A, Gilin D. Workplace empowerment, incivility, and burnout: impact on staff nurse recruitment and retention outcomes. *J Nurs Manag*. 2009;17(3):302-311. doi:10.1111/j.1365-2834.2009.00999.x.

125. Schreuder JAH, Roelen CAM, Koopmans PC, Moen BE, Groothoff JW. Effort–reward imbalance is associated with the frequency of sickness absence among female hospital nurses: a cross-sectional study. *Int J Nurs Stud*. 2010;47(5):569-576. doi:10.1016/j.ijnurstu.2009.10.002.

126. Mikkonen J, Raphael D. Social determinants of health: The Canadian facts. 2010. Retrieved from: http://thecanadianfacts.org/the_canadian_facts.pdf

127. Registered Nurses' Association of Ontario. *Coming Together, Moving Forward: Building the Next Chapter of Ontario's Rural, Remote and Northern Nursing Workforce.* Toronto, ON: Registered Nurses' Association of Ontario;2015:1-42.

128. Killam LA, Carter LM, 2010. Challenges to the student nurse on clinical placement in the rural setting: a review of the literature. *Rural Remote Health*. 2010;10(1523).

129. National Institutes of Health. Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies. Retrieved from: https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

130. Elm Von E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ.* 2007;335:806. doi:10.1136/bmj.39335.541782.AD.

131. Stroup DF, Berlin JA, Morton SC, et al. Meta-analysis of observational studies in epidemiology. *JAMA*. 2000;283(15): 2008-2012.

132. Carlson MDA, Morrison RS. Study design, precision, and validity in observational studies. *J Palliat Med.* 2009;12(1):77-82. doi:10.1089/jpm.2008.969 0.

133. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. A basic introduction to fixed-effect and random-effects models for meta-analysis. *Res Synth Methods.* 2010;1(2):97-111. doi:10.1002/jrsm.12.

134. Shenton A. Strategies for ensuring trustworthiness in qualitative research projects. *Educ Inform.* 2004;22:63-75.

135. Golafshani N. Understanding reliability and validity in qualitative research. *Qual Rep.* 2003;8(4):597-607.

136. Grove WM, Zald DH, Lebow BS, Snitz BE, Nelson C. Clinical versus mechanical prediction: a meta-analysis. *Psychol Assess.* 2000;12(1):19-30. doi:10.10 37/1040-3590.12.1.19.

137. Canadian Union of Public Employees. Canadian Union of Public Employees. Retrieved from: http://www.cupe.on.ca.

138. Ontario Nurses' Association. Ontario Nurses' Association. Retrieved from: https://www.ona.org.

139. Canadian Federation of Nurses Unions. Ret.from: https://www.nursesunions.ca/

140. Nocera M, Merritt C. Pediatric critical event debriefing in emergency medicine training: an opportunity for educational improvement. *AEM Educ Train.* 2017;1(3):208-214. doi:10.1002/aet2.10031.

# Appendix A

Registered Protocol for Systematic Review

Dr Nancy Lightfoot. Laurentian University
Dr Elizabeth Wenghofer. Laurentian University

## 12. * Funding sources/sponsors.

Give details of the individuals, organizations, groups or other legal entities who take responsibility for initiating, managing, sponsoring and/or financing the review. Include any unique identification numbers assigned to the review by the individuals or bodies listed.

None

## 13. * Conflicts of interest.

List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review.

None

## 14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members.

Dr Behdin Nowrouzi. Laurentian University

## 15. * Review question.

State the question(s) to be addressed by the review, clearly and precisely. Review questions may be specific or broad. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS where relevant.

What are the risk factors associated with sickness absence in nursing personnel, including nurses' aides?

## 16. * Searches.

Give details of the sources to be searched, search dates (from and to), and any restrictions (e.g. language or publication period). The full search strategy is not required, but may be supplied as a link or attachment.

A keyword literature search will be conducted on the following online databases: PsycINFO, PubMed, CINAHL, and ProQuest.
The command "OR" will be used with the following keywords: 'predictor(s)', 'risk factor(s)', and 'risk(s)'.
These terms will be combined with (i.e., using the "AND" command) a list of other possible keywords (i.e., using the "OR" command): 'lost-time', 'time loss', 'sick time', 'sick absence', 'injur*', 'illness(es)', 'disabilit*', and 'sickness(es)'.
These two sets of keywords will then be combined with (i.e., using the "AND" command) the word, 'nurs*'.
In addition, the reference lists of articles identified for inclusion in the review will also be checked="checked" value="1" for further sickness absence and predictors in nursing staff.

## 17. URL to search strategy.

Give a link to the search strategy or an example of a search strategy for a specific database if available (including the keywords that will be used in the search strategies).

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Do not make this file publicly available until the review is complete

## 18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.

Independent variables: musculoskeletal, psychological, organizational (including: shift work, leadership), personal (age, history of sickness absence, job tenure).

## 19. * Participants/population.

Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.

Inclusion: to ensure that all relevant predictors are included for this study, any study that has examined staff with nursing duties will be included. This will include, but will not be limited to: registered nurses (RN)s, registered practical nurses (RPNs), nurses' aides, personal support workers, and RN or RPN nursing students.
Exclusion: nurse practitioners will be excluded from this population as they are seen as primary caregivers, and do not share the same duties as other nursing staff.
Studies that include nurses in conjunction with other staff will also be excluded, although if the authors have listed predictors and lost-time effect sizes for each occupation (i.e., independent sample sizes) separately, then the study will be included.

## 20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the nature of the interventions or the exposures to be reviewed.

Any risk factors related to sickness absence will be considered. The outcome of interest is sickness absence which is defined as the missing of work due to injury, illness, and/or disability, and includes psychological causes. This differentiates it from regular absenteeism, which can be due to additional factors (vacation, other personal reasons, etc.).

## 21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

Some studies might use other staff as comparators, such as case control studies.

## 22. * Types of study to be included.

Give details of the types of study (study designs) eligible for inclusion in the review. If there are no restrictions on the types of study design eligible for inclusion, or certain study types are excluded, this should be stated. The preferred format includes details of both inclusion and exclusion criteria.

Because sickness absence cannot be randomized, this study will examine only observational studies (case-control, cohort, and cross-sectional studies).

## 23. Context.

Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.

Nursing staff (except Nurse Practitioners) from all work settings were examined

## 24. * Primary outcome(s).

Give the pre-specified primary (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

Sickness absence (short-term and long-term).

## Timing and effect measures

## 25. * Secondary outcome(s).

List the pre-specified secondary (additional) outcomes of the review, with a similar level of detail to that required for primary outcomes. Where there are no secondary outcomes please state 'None' or 'Not applicable' as appropriate to the review

None.

## Timing and effect measures

## 26. Data extraction (selection and coding).

Give the procedure for selecting studies for the review and extracting data, including the number of researchers involved and how discrepancies will be resolved. List the data to be extracted.

A preliminary (pilot test) of the literature search was conducted in order to create a comprehensive coding manual related to the research questions presented above. The titles and abstracts of articles were then searched using the strategy previously outlined, and studies potentially eligible for inclusion in the review identified. A checklist adapted from the Cochrane Collaboration's guidelines was used to make a final judgement regarding article inclusion/exclusion.

## 27. * Risk of bias (quality) assessment.

State whether and how risk of bias will be assessed (including the number of researchers involved and how discrepancies will be resolved), how the quality of individual studies will be assessed, and whether and how this will influence the planned synthesis.

Risk of bias will be evaluated using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies.

## 28. * Strategy for data synthesis.

Give the planned general approach to synthesis, e.g. whether aggregate or individual participant data will be used and whether a quantitative or narrative (descriptive) synthesis is planned. It is acceptable to state that a quantitative synthesis will be used if the included studies are sufficiently homogenous.

A data synthesis will be provided under specific categories (e.g., musculoskeletal) and the following information will be provided:
- Study ID (first author's last name and year of publication);
- Country of origin;
- Study design;
- Sample size;
- Demographic information pertaining to sample;
- Purpose of the study;
- Presented lost-time predictors;
- Outcome, which is presented in lost-time in days;
- Category under which the duration of lost-time will be grouped. Short-term lost-time will be operationalized as 1-7 days, and long-term will be operationalized as longer than 7 days;
- Conflicts of interests addressed in the study;
- Analysis and results (effect sizes);
- Authors' conclusions.

## 29. * Analysis of subgroups or subsets.

Give details of any plans for the separate presentation, exploration or analysis of different types of participants (e.g. by age, disease status, ethnicity, socioeconomic status, presence or absence or co-morbidities); different types of intervention (e.g. drug dose, presence or absence of particular components of intervention); different settings (e.g. country, acute or primary care sector, professional or family care); or different types of study (e.g. randomised or non-randomised).

A number of variables were examined and were classified under the following titles:

1. Demographic:
a. Increased Age
b. Sex
2. Lifestyle:
a. Physical Acivity
b. Sleep Difficulties
3. Physical Health:
a. Perceived Health
b. Previous Sick Leave
c. Musculoskeletal Pain
d. Musculoskeletal Pain - Back Pain Only
4. Mental Health:
a. Mental Health - Mostly Anxiety
b. Mental Health - Mostly Depression
5. Organizational:
a. Nurse vs. Nurse Aide
b. Shiftwork - Mainly Working Nightshift
c. Work Setting - Outpatient
d. Work Setting - Surgical Unit
e. Work Setting - Paediatric Unit
f. Work Setting - Psychiatric Unit
6. Work-Related Psychosocial Factors:
a. Fatigue
b. Job Strain
c. High Job Demand
d. High Job Control
e. High Job Satisfaction
f. High Work Support
g. Low Work Support

## 30. * Type and method of review.

Select the type of review and the review method from the lists below. Select the health area(s) of interest for your review.

### Type of review

Cost effectiveness
No

Diagnostic
No

Epidemiologic
No

Individual patient data (IPD) meta-analysis
No

Intervention
No

Meta-analysis
Yes

Methodology
No

Network meta-analysis
No

Pre-clinical
No

Prevention
No

Prognostic
No

Prospective meta-analysis (PMA)
No

Qualitative synthesis
No

Review of reviews
No

Service delivery
No

Systematic review
Yes

Other
No

## Health area of the review

Alcohol/substance misuse/abuse
No

Blood and immune system
No

Cancer
No

Cardiovascular
No

Care of the elderly
No

Child health
No

Complementary therapies
No

Crime and justice
No

Dental
No

Digestive system
No

Ear, nose and throat
No

Education
No

Endocrine and metabolic disorders
No

Eye disorders
No

General interest
No

Genetics
No

Health inequalities/health equity
No

Infections and infestations
No

International development
No

Mental health and behavioural conditions
Yes

Musculoskeletal
Yes

Neurological
No

Nursing
Yes

Obstetrics and gynaecology
No

Oral health
No

Palliative care
No

Perioperative care
No

Physiotherapy
No

Pregnancy and childbirth
No

Public health (including social determinants of health)
Yes

Rehabilitation
No

Respiratory disorders
No

Service delivery
No

Skin disorders
No

Social care
No

Surgery
No

Tropical Medicine
No

Urological
No

Wounds, injuries and accidents
No

Violence and abuse
No

## 31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.
English

There is not an English language summary

## 32. Country.

Select the country in which the review is being carried out from the drop down list. For multi-national collaborations select all the countries involved.

Canada

## 33. Other registration details.

Give the name of any organisation where the systematic review title or protocol is registered (such as with The Campbell Collaboration, or The Joanna Briggs Institute) together with any unique identification number assigned. (N.B. Registration details for Cochrane protocols will be automatically entered). If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

## 34. Reference and/or URL for published protocol.

Give the citation and link for the published protocol, if there is one

Give the link to the published protocol.

Alternatively, upload your published protocol to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Yes I give permission for this file to be made publicly available

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

## 35. Dissemination plans.

Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

## Do you intend to publish the review on completion?

Yes

## 36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords will help users find the review in the Register (the words do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

Predictors, Sickness Absence, Nurses, Nurses' Aides

## 37. Details of any existing review of the same topic by the same authors.

Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

## 38. * Current review status.

Review status should be updated when the review is completed and when it is published.
Please provide anticipated publication date

Review_Completed_not_published

## 39. Any additional information.

Provide any other information the review team feel is relevant to the registration of the review.

## 40. Details of final report/publication(s).

This field should be left empty until details of the completed review are available.

Give the link to the published review.

# Appendix B

Article Eligibility Screening

## Eligibility Screening

**Study ID:**

**[1] Type of Study**

Is the study described as observational? (Case-control, Cohort, Cross-sectional)

Yes | Unclear | No

**Go to next Q** **Exclude**

**[2] Participants in study**

Yes | Unclear | No

Were participants in the study exclusive to nurses or health care aides?

If not, are samples of occupations observed independently (separate sample sizes)?

**Go to next Q** **Exclude**

**[3] Outcome**

Yes | Unclear | No

Was/ere outcome(s) measured in lost time?

**Go to next Q** **Exclude**

**[4] Predictors**

Yes | Unclear | No

Is/are sickness absence predictor(s) stated clearly?

**Go to next Q** **Exclude**

**[5] Predictors**

Yes | Unclear | No

Was/were effect size(s) displayed by the authors? If not, is there enough statistical information to calculate effect sizes?

**Final decision** **INCLUDE** **UNCLEAR** **EXCLUDE**

**Additional notes:**

_____
_____
_____
_____
_____
_____

# Appendix C

National Health's Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIHQA)

| Criteria | Yes | No | Other (CD, NR, NA)* |
|---|---|---|---|
| 1. Was the research question or objective in this paper clearly stated and appropriate? | | | |
| 2. Was the study population clearly specified and defined? | | | |
| 3. Did the authors include a sample size justification? | | | |
| 4. Were controls selected or recruited from the same or similar population that gave rise to the cases (including the same timeframe)? | | | |
| 5. Were the definitions, inclusion and exclusion criteria, algorithms or processes used to identify or select cases and controls valid, reliable, and implemented consistently across all study participants? | | | |
| 6. Were the cases clearly defined and differentiated from controls? | | | |
| 7. If less than 100 percent of eligible cases and/or controls were selected for the study, were the cases and/or controls randomly selected from those eligible? | | | |
| 8. Was there use of concurrent controls? | | | |

| Criteria | Yes | No | Other (CD, NR, NA)* |
|---|---|---|---|
| 9. Were the investigators able to confirm that the exposure/risk occurred prior to the development of the condition or event that defined a participant as a case? | | | |
| 10. Were the measures of exposure/risk clearly defined, valid, reliable, and implemented consistently (including the same time period) across all study participants? | | | |
| 11. Were the assessors of exposure/risk blinded to the case or control status of participants? | | | |
| 12. Were key potential confounding variables measured and adjusted statistically in the analyses? If matching was used, did the investigators account for matching during study analysis? | | | |

| **Quality Rating (Good, Fair, or Poor) (see guidance)** |
| --- |
| Rater #1 Initials: |
| Rater #2 Initials: |
| Additional Comments (If POOR, please state why): |

*CD, cannot determine; NA, not applicable; NR, not reported

# Appendix D

Quality Assessment: Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)

STROBE Statement—checklist of items that should be included in reports of observational studies

| | Item No | Recommendation |
|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found |
| **Introduction** | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses |
| **Methods** | | |
| Study design | 4 | Present key elements of study design early in the paper |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection |
| Participants | 6 | (*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up<br>*Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls<br>*Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants |
| | | (*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed<br>*Case-control study*—For matched studies, give matching criteria and the number of controls per case |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group |
| Bias | 9 | Describe any efforts to address potential sources of bias |
| Study size | 10 | Explain how the study size was arrived at |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding |
| | | (*b*) Describe any methods used to examine subgroups and interactions |
| | | (*c*) Explain how missing data were addressed |
| | | (*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed<br>*Case-control study*—If applicable, explain how matching of cases and controls was addressed<br>*Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy |
| | | (*e*) Describe any sensitivity analyses |

Continued on next page

| | | |
|---|---|---|
| **Results** | | |
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed |
| | | (b) Give reasons for non-participation at each stage |
| | | (c) Consider use of a flow diagram |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders |
| | | (b) Indicate number of participants with missing data for each variable of interest |
| | | (c) *Cohort study*—Summarise follow-up time (eg, average and total amount) |
| Outcome data | 15* | *Cohort study*—Report numbers of outcome events or summary measures over time |
| | | *Case-control study*—Report numbers in each exposure category, or summary measures of exposure |
| | | *Cross-sectional study*—Report numbers of outcome events or summary measures |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included |
| | | (*b*) Report category boundaries when continuous variables were categorized |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses |
| **Discussion** | | |
| Key results | 18 | Summarise key results with reference to study objectives |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results |
| **Other information** | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based |

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

# Appendix E

Recruitment Ad for Nurses and Personal Support Workers

LaurentianUniversity
UniversitéLaurentienne

# Predictors of lost-time injury, illness, and disability in nurses and health care aides

You are invited to participate in a focus group for a research project. The purpose of this study is to understand what are the risk factors related to workplace absences due to injury or illness among nurses (e.g. registered nurses & registered practical nurses) and health care aides (e.g. Personal Support Workers). We are seeking nurses and health care aides who work at Health Sciences North **OR** St. Joseph's Continuing Care with a minimum of 10 years of relevant work experience to participate in this focus group.

Participation is completely voluntary. The focus group should take approximately 60-90 minutes. A $25 gift certificate will be awarded as a token of appreciation.

The gift certificate will be given to you on the date of the focus group session before participating.

**If you or someone you know is interested to participate, please contact Basem Gohar, (Ph.D. student) by email: bx_gohar@laurentian.ca**

For any questions about your role in this study, please contact Basem Gohar by email: bx_gohar@laurentian.ca or at 705-988-3228. You may also contact Dr. Michel Larivière, Ph.D., C.Psych. who is the supervisor of this research project at mlariviere@laurentian.ca or 705-675-1151 ext. 1202/ 1-800-675-1151 ext. 1202

# Appendix F

Recruitment Transcript

Recruitment Transcript

Greetings,

My name is Basem Gohar and I am a Ph.D. Student in the Interdisciplinary Rural and Northern Health Doctoral Program at Laurentian University. My doctoral thesis is seeking to examine predictors of lost-time injury, illness, and disability (which I call IID) among nurses and health care aides.
As you may know, nurses and health care aides have the highest rates of absence due to physical and mental injuries/diseases that may be linked to high nurse shortages in Canada and worldwide. Not to mention, the economic cost to replace nurses as well as the increase of mandatory hours due to the shortages and turnover rates, which in itself is an injurious risk factor.

With that being said, my study has three purposes. The first purpose is to do a detailed search of the literature and conduct a meta-analysis in order to identify the effect of all the predictors presented in the literature. A meta-analysis is a statistical method that could help us examine all studies in the literature to identify the overall size of the effect (in this case the predictor) on an outcome (in this case lost-time). The second purpose is to develop an actuarial instrument based on the effects that were statistically correlated with lost-time IID. It is my hopes that this instrument will help notify employers and policy makers of the level of risk that a nurse or health care aid may have to lost-time IID. My third purpose is to gain an applied understanding of such risk factors in the workplace.

I will be conducting three series of focus groups. One focus group will be with registered nurses, registered practical nurses, and health care aides from Sudbury. The second will be with managerial staff members from Sudbury who deal with lost-time claims internally. The third focus group will be with occupational health specialists who deal with the claims.

Given your job position, I believe that you would have some valuable information and experiences that you could share. I was hoping if you would be interested in participating in my study where you will be invited to participate in a focus group discussion along with other professionals with similar job positions where you all can share your experiences. There will approximately be five other participants with similar job positions to yours from Sudbury. Please note that your participation is strictly voluntary and you may choose to withdraw at any point. Also, given your role in Sudbury, there is a potential threat to confidentiality, although participants' names will be kept anonymous. That being said, I believe that your insight would be of value and would help the profession. At this time, I would be happy to answer any questions, concerns or feedback that you may have for me.

Thank you,

## Appendix G:

Information Page and Consent:
Nurses, HCAs, and Key Informants

# Information Page/Consent

**Letter of Information to nurses and health care aides (Phase II: Focus Group)**

**Study Title:**
Assessing the Risk of Workplace Injury, Illness, and Disability: Creating a Meta-analytically Informed Instrument for Lost-time Prediction in Nurses and Health Care Aides

**Primary Investigator:**
Basem Gohar, M.Sc., Ph.D. Student in the Interdisciplinary in Rural & Northern Health, Laurentian University

**Co-investigators (Thesis Committee):**
Michel Larivière, Ph.D., C.Psych., School of Human Kinetics & Northern Ontario School of Medicine, Laurentian University (Thesis Supervisor)
Nancy Lightfoot, Ph.D., School of Rural and Northern Health, Laurentian University
Céline Larivière, Ph.D., School of Human Kinetics, Laurentian University

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I am a Ph.D. Student in the Interdisciplinary Rural and Northern Health Program at Laurentian University. My doctoral thesis is seeking to examine predictors of lost-time injury, illness, and disability (IID) among nurses and health care aides.

**Study Purpose**

My study has three purposes. The first purpose it to do a detailed search of the literature and conduct a meta-analysis in order to identify the effect of all the predictors presented in the literature. A meta-analysis is a statistical method that could help us examine all studies in the literature to identify the overall size of the effect (in this case the predictor) on an outcome (in this case lost-time IID). The second purpose is to develop an actuarial instrument based on the effects that were statistically correlated with lost-time IID. It is my hopes that this instrument will help notify employers and policy makers of the level of risk that a nurse may have to lost-time IID. My third purpose is to gain an applied understanding of such risk factors in the workplace.

**Focus Groups**

During the focus group session, approximately 3-4 other registered nurses and/or registered practical nurses, and 3-4 health care aides, who also have over 10 years of work experience, will join you. Together, we will all review the predictors listed in the instrument. You will be asked to provide your feedback based on the relevance of the predictors from your experiences in working in Sudbury. You will also be invited to add feedback additional predictors that might have not been found in the literature.

**Risks**

There is a minimal risk that emotional distress may be created when discussing lost-time IID if you had experienced them or know someone who has. Should you experience distress or discomfort during the focus group, you can terminate your participation without providing a reason. Additionally, if needed, a mental health counsellor can be contacted for counselling purposes. You may also wish to contact the Employee Assistance Program at your respective workplace location.

**Benefits**

There are no personal benefits provided in this study. However, you may find that participating in this focus group may allow you to reflect upon your employment and health. Also, your feedback may help the nursing profession in northeastern Ontario, specifically Sudbury to be a safer and healthier work environment. If you are interested in the study findings, a summary of the findings will be used to generate a report available to the public, where one can be sent to you. Only group information obtained from this study will be reported and will form the basis of a thesis for Basem Gohar as part of the Ph.D. requirement in at Laurentian University. Once completed, the findings will also be submitted for publication.

**Confidentiality**
Once the focus group session is completed, each participant will be given a numeric value during transcription, which will replace the use of names or other identifying information to ensure confidentiality. This researcher will be the only individual who has access to the audio recorder with identifying information. Transcription will take place in the secure office of the thesis supervisor. The audio recorder as well as the consent forms will all be securely locked in the designated office filing space of this researcher, where only this researcher has access to the cabinet in the School of Rural and Northern Health at Laurentian University.

**Cost for participation**
The only cost to you will be your valuable time to partake in the focus group, which is truly appreciated.

**Compensation**
As a token of appreciation, a $25.00 gift certificate will be provided to each participant in the focus group. It will be given on the same date as the focus group session before participating.

**Ethics**
This study has been reviewed and approved by the Laurentian University Research Ethics Board and Health Sciences North Ethics Committee. Shouldyou have additional comments, concerns, or questions about your rights as a participant, please do not hesitate to contact

Laurentian University Research Office
Tel: 705-675-1151 ext. 3213 or 1-800-675-1151 ext. 3213

**Questions**
For any questions about your role in this study, please contact Basem Gohar at bx_gohar@laurentian.ca. You may also contact Dr. Michel Larivière, at 705-675-1151 ext. 1202 or 1-800-675-1151 ext. 1202, or mlariviere@laurentian.ca

Sincerely,

Basem Gohar, M.Sc.
School of Rural and Northern Health, Laurentian University

LaurentianUniversity
UniversitéLaurentienne

# Information Page/ Consent

## Letter of Information to Key Informants (Phase II: Focus Group)

**Study Title:**
Assessing the Risk of Workplace Injury, Illness, and Disability: Creating a Meta-analytically Informed Instrument for Lost-time Prediction in Nurses and Health Care Aides

**Primary Investigator:**
Basem Gohar, M.Sc.
**Co-investigators (Thesis Committee):**
Michel Larivière, Ph.D., C.Psych., School of Human Kinetics & Northern Ontario School of Medicine, Laurentian University (Thesis Supervisor)
Nancy Lightfoot, Ph.D., School of Rural and Northern Health, Laurentian University
Céline Larivière, Ph.D., School of Human Kinetics, Laurentian University

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I am a Ph.D. Student in the Interdisciplinary Rural and Northern Health Program at Laurentian University. My doctoral thesis is seeking to examine predictors of lost-time injury, illness, and disability (IID) among nurses and health care aides.

**Study Purpose**

My study has three purposes. The first purpose it to do a detailed search of the literature and conduct a meta-analysis in order to identify the effect of all the predictors presented in the literature. A meta-analysis is a statistical method that could help us examine all studies in the literature to identify the overall size of the effect (in this case the predictor) on an outcome (in this case lost-time IID). The second purpose is to develop an actuarial instrument based on the effects that were statistically correlated with lost-time IID. It is my hopes that this instrument will help notify employers and policy makers of the level of risk that a nurse and/or health care aid may have to lost-time IID. My third purpose is to gain an applied understanding of such risk factors in the workplace.

**Focus Groups**

Attached with this letter is a copy of the instrument that lists the predictors of lost-time IID that were gathered from the literature. During the focus group session, approximately 4-5 other Occupational health specialists who deal with compensation and lost-time claims for Sudbury registered nurses, registered practical nurses, and health care aides. Together, we will all review the predictors listed in the instrument. You will be asked to provide your feedback based on the relevance of the predictors from your knowledge regarding nurses and health care aides in Sudbury. You will also be invited to add feedback additional predictors that might have not been found in the literature.

**Risks**

There is a minimal risk that emotional distress may be created when discussing lost-time IID if you had experienced them or know someone who has. Should you experience distress or discomfort during the focus group, you can terminate your participation without providing a reason. Additionally, if needed, a mental health counsellor can be contacted for counselling purposes. You may also wish to contact the Employee Assistance Program at your respective workplace location.

**Benefits**

There are no personal benefits provided in this study. However, you may find that participating in this focus group may allow you to reflect upon your employment and health. Also, your feedback may help the nursing profession in northeastern Ontario, specifically Sudbury to be a safer work environment. If you are interested in the study findings, a summary of the findings will be used to generate a report available to the public, where one can be sent to you. Only group information obtained from this study will be reported and will form the basis of a thesis for Basem Gohar as part of the Ph.D. requirement in at Laurentian University. Once completed, the findings will also be submitted for publication.

**Confidentiality**
Once the focus group session is completed, each participant will be given a numeric value during transcription, which will replace the use of names or other identifying information to ensure confidentiality. This researcher will be the only individual who has access to the audio recorder with identifying information. Transcription will take place in the secure office of the thesis supervisor. The audio recorder as well as the consent forms will all be securely locked in the designated office filing space of this researcher, where only this researcher has access to the cabinet in the School of Rural and Northern Health at Laurentian University. Despite all these efforts, there is a potential threat to confidentiality given your unique position.

**Cost for participation**
The only cost to you will be your valuable time to partake in the focus group, which is truly appreciated.

**Ethics**
This study has been reviewed and approved by the Laurentian University Research Ethics Board and Health Sciences North Ethics Committee. Should you have additional comments, concerns, or questions about your rights as a participant, please do not hesitate to contact

Laurentian University Research Office
Tel: 705-675-1151 ext. 3213 or 1-800-675-1151 ext. 3213

**Questions**
For any questions about your role in this study, please contact Basem Gohar at bx_gohar@laurentian.ca. You may also contact Dr. Michel Larivière, at 705-675-1151 ext. 1202 or 1-800-675-1151 ext. 1202, or mlariviere@laurentian.ca

Sincerely,

Basem Gohar, M.Sc.
School of Rural and Northern Health, Laurentian University

LaurentianUniversity
UniversitéLaurentienne

**Informed Consent Form**

**Study Title:**
Assessing the Risk of Workplace Injury, Illness, and Disability: Creating a Meta-analytically Informed Instrument for Lost-time Prediction in Nurses and Health Care Aides

**Primary Investigator:**
Basem Gohar, M.Sc.
**Co-investigators (Thesis Committee):**
Michel Larivière, Ph.D., C.Psych., School of Human Kinetics & Northern Ontario School of Medicine, Laurentian University (Thesis Supervisor)
Nancy Lightfoot, Ph.D., School of Rural and Northern Health, Laurentian University
Céline Larivière, Ph.D., School of Human Kinetics, Laurentian University

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I have read the information presented in the Information Page/ Consent regarding the research projected conducted by Ph.D. Student, Basem Gohar and advisors, Michel Larivière, Nancy Lightfoot and Céline Larivière.

I understand that I am being asked to partake in a focus group session that will take approximately 60-90 minutes for completion where predictors of lost-time injury, illness, and diseases will be discussed regarding nurses (registered nurses & registered practical nurses) and health care aides (personal support workers) from Sudbury, Ontario.

I understand that by signing this form, I have consented to participate in the above-mentioned study. I understand that my participation is voluntary and that I may withdraw at any time. I understand that I will not benefit from my involvement in the study and that a copy of this information letter has been provided to me. I voluntarily consent to participate in this study.

Date _____
Participant's Signature_____
For further information, please contact:
Basem Gohar
Ph.D. Student, School of Rural and Northern Health
Laurentian University
Email: bx_gohar@laurentian.ca
Tel: 705-988-3228

## Appendix H

Focus Group Interviewing Guide

**1. Welcome/Opening: Thank participants for attending.**
**2. Definition: A risk factor is variable correlated with an increased risk of injury, illness, and or disability.**
**3. Questions:**
a. Based on your experience, what are some potential risk factors that predict, or are associated with, work-related illness or disability in nurses and health care aides?
c. In your opinion, are there any potential risk factors that you think are specific to Sudbury and/or northeastern Ontario and why?
d. Is there anything else that you would like to add?