

2016

Return to Full Duty Work: Determining the Ideal Time to Refer Occupationally Isolated Acute Low Back Pain Patients to Physical Therapy

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Walden University

College of Health Sciences

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Aletha Stephenson

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2016

Abstract

Return to Full Duty Work: Determining the Ideal Time to Refer Occupationally-Isolated
Acute Low Back Pain Patients to Physical Therapy

by

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Post MS, Allegheny University, 1997

MSN, West Chester University, 1995

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Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

May 2016

Abstract

Employees who develop and report nontraumatic acute low back pain that occurs while performing work duties, or shortly thereafter, are classified as having occupational isolated acute low back pain (OIALBP). The purpose of this project was to identify and implement an evidence-based time frame to refer occupational isolated acute low back pain patients (OIALBPPs) to physical therapy (PT) that returns them to full duty work (FDW) more quickly. The diffusion of innovation theory aided the project leader and health care providers to develop strategies to overcome barriers in implementing the project's results into the practice. A total of 932 medical records of OIALBPPs who presented to the organization from 2009 through 2015 were retrieved and abstracted by the organization's occupational health providers. The project leader analyzed the data and identified the best time frame to refer their OIALBPPs to PT. A *t* test, Chi-square, and an Analysis of Variance were used in the data analysis. The results were employed to design and construct tables in Excel. Early PT is defined as a PT initial evaluation that occurs < 10 days after back pain onset. A significant ($p < 0.001$) difference of 13.5 days between early and delayed PT groups was identified. Significant differences persisted when evaluated by sex, age bracket, occupational group, and incidence of failure to return to FDW. In conclusion, OIALBPPs who receive early PT return to FDW nearly 2 weeks sooner than do those who delay PT. Early PT may reduce health care cost, reduce lost employee income, increase productivity, increase company revenue, and lower insurance costs. Referring OIALBPPs to PT early may lower the economic burden placed on health care budgets and society as a whole.

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Dedication

This project is dedicated to all of my fellow nurses around the world. Thank you for all you do every day to serve others in their time of need. I dreamed of becoming a nurse for as long as I can remember, and I can honestly say I have never regretted becoming a nurse. I am very blessed and honored to be able to serve others in their time of need.

Acknowledgments

I would like to thank the Walden School of Nursing faculty, Walden's writing center and library staff, my family members, committee members, classmates, and friends who helped me reach this point in my academic career.

I would like to personally thank my chairperson for all the support and guidance he provided to my classmates and I, always reminding us that quitting was never an option. I would also like to thank my preceptor for being such a transformational leader and mentor to me.

Lastly, I would like to thank God for blessing me with my best friend, my husband, and the father of my wonderful children. Thank you for being the wind beneath my wings. I cannot imagine living a day without you in my life. You have always supported and encouraged me to do whatever I wanted to do. I can only pray that we will be able to exhale soon and truly enjoy one another.

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Section 1: Overview of the Evidence-Based Project

Introduction

Low back pain (LBP) is defined as pain that is noted in the inferior dorsal trunk of the body that lasts for one or more days. Acute low back pain (ALBP) typically lasts less than four weeks. The dorsal trunk area beginning at the lower margin of the twelfth ribs and ending at the lower base of the gluteal folds is defined as the low back (Hoy, Brooks, Blyth, & Buchbinder, 2010).

ALBP is a global health care problem that is considered to be the leading cause of decreased activity and lost days of work among employees throughout much of the world. Results from the Global Burden of Disease (GBD) 2010 study concluded that LBP is the leading cause of global disability (Hoy et al., 2014). In the United States LBP is the fifth most common reason that a person visits their physician. It is estimated that LBP will affect approximately 80% of individuals at some time in their life (Hoy et al., 2010). Persons age 45 to 65 are at greatest risk of developing LBP. The general population's estimated point prevalence related to LBP ranges between 20 to 30 percent (Waterman, Belmont, & Schoenfeld, 2012). The increased prevalence of ALBP among working individuals places a huge burden on health care revenue and resources. Industries and society spends billions of dollars annually on occupational related injuries and disabilities (Deyo, 2011, Crow & Willis, 2009). In 2008, a total of 244,150 cases of nonfatal back injuries were reported to the National Safety Council (NSC) from private sector employers. The NSC estimated the total cost of occupational injuries to be \$117 billion. The high economic burden associated with LBP is attributed directly to the high cost of

health care and indirectly to lost income and lost productivity (Dagenais, Tricco, & Haldeman, 2010). Nonmedical costs related to lost productivity, administrative expenses, and employer costs account for 82% (\$96 billion) of the total expenses incurred (NSC, 2011). Annually the United States spends 30-50 billion health care dollars treating LBP (Chou & Chekelle, 2010).

There were 1.6 million injuries reported to the Bureau of Labor's National Institute of Occupational Safety and Health (NIOSH) in 2013. These were reported due to the occurrence of (a) days away from work, (b) restricted work duty, or (c) transfer to another job (DART—days away, restrictions, and transfers) after a work related injury. Musculoskeletal disorders (MSD) accounted for 33% (528,000) of reported injuries. Back injuries make up 11.5% (185,000) of DARTs. LBP injuries make up 17.5% of injuries involving days away from work, with a median number of days out of work equaling eight. Nearly 65% of work related low back injuries are isolated nontraumatic overexertion, sprains, and strains, and do not involve motor vehicle accidents, slips and falls, assault, or multiple trauma. These isolated low back injuries represent 7.5% (120,000) of DARTs (Bureau of Labor Statistics [BLS], 2014).

Employees who experience and report nontraumatic ALBP which occurred while they were performing their work duties, or shortly after completing them, are classified as having occupational isolated acute low back pain (OIALBP), a subset of ALBP. The presence of any type of external trauma applied to the employee's body would exclude the diagnosis of OIALBP. These traumas would include assaults, blows to the back, slips, falls, machine, and vehicular accidents. Activities which could cause occupational

isolated acute low back pain are: bending, carrying, lifting, pushing, pulling, stooping, reaching, sitting, twisting, and turning.

The timing of what is considered to be the ideal time to refer to physical therapy (PT) differs throughout the literature. The literature supports the findings that absenteeism, presenteeism, and lost productivity results from the impairment of ALBP. The search of the literature did not uncover any studies which directly addressed whether receiving early PT returned occupational isolated acute low back pain patients (OIALBPPs) to full duty work (FDW) sooner than patients who did not receive early PT. Identifying the most efficient and effective time to refer OIALBPPs to PT is critical to addressing the negative socioeconomic impact of OIALBP.

Problem Statement

This project's goal was to identify the most ideal time to refer OIALBPPs to PT that would allow them to return to FDW in the shortest amount of time. The practicum site did not have an evidence-based time frame for referring their OIALBPPs to PT. This negatively impacted their ability to compete for industrial medicine contracts with employers. Having an OIALBP standard for referring to PT, with significantly improved outcomes, may improve their marketing efforts over their competitors. Knowing the best evidence-based time frame to refer their OIALBPPs to PT allows the organization's occupational health providers to follow a proven standard of care. Safely returning patients to FDW sooner could have a positive effect on lowering the high medical and indemnity costs which are associated with OIALBP. These are positive benefits not only

to the organization, but also to the injured workers, their families, employers, insurance companies, and society as a whole.

Purpose Statement

The purpose of this project was to analyze the retrospective OIALBPP health data abstracted by the organization's occupational health providers to determine the most ideal time to refer OIALBPPs to PT. As the project leader, I worked collaboratively with the occupational health care providers to analyze their collected data. The findings were implemented into the organization's existing OIALBP standard.

Evidence-based practice (EBP) is considered the gold standard that allows health providers to obtain the best possible outcomes for their patients. EBP enables health providers to pass the lowest available health care costs onto employees, employers, the organization, health care system, and society (Ladeira, 2011). Integrating current best evidence along with the patient's values and the health provider's clinical expertise makes up the EBP process (Ladeira, 2011).

Goals and Objectives

This project focused on identifying the most ideal time to refer OIALBPPs to PT in order to return them to FDW as soon as possible. Once analyzed, the data findings were implemented into the existing OIALBP standard. The evidence-based OIALBP time frame will be used to assist the organization's health care providers in making decisions regarding OIALBPPs and the best time to initiate PT. As the project leader, I worked collaboratively with the occupational health care providers to develop an evidence-based time frame to refer OIALBPPs to PT. The standards committee members included a

doctor of nursing practice student who served as the project leader, an occupational nurse practitioner, and two occupational health care physicians. The project's findings were the guides used to revise the OIALBP standard. Standards are used to translate best evidence into best practice. Standards are considered to be a clinical metric to health care.

Educating health care providers about standards, and how they should be used as a guide to improving care, is important to producing positive patient care outcomes (Rosenfeld, Shiffman, & Robertson, 2013).

Research Questions

1. In OIALBPPs, how does receiving early PT affect the length of time to return to FDW compared to delaying PT?
2. In OIALBPPs, does delaying PT lead to failure to return to FDW?
3. In regard to the effect on the length of time for OIALBPPs to return to FDW, are there any sex, age, occupational group, or injury severity differences in receiving early PT versus delaying PT?

Theoretical Foundation

The theoretical framework increases the project's scientific value by allowing the project's findings to be integrated into a larger body of knowledge (McEwen & Wills, 2011). Gabriel Tarde, a French sociologist, was the first person to discuss the diffusion of innovation (DOI) theory in 1903 (Kaminski, 2011). The DOI is used as a change model that aids in introducing the evidence-based change into an organization, practice, or community. Change agents utilize DOI to map the process that occurs as stakeholders

adopt the change. DOI contains a 5-stage adoption process that aids in diffusing organizational change:

1. Knowledge/awareness stage.
2. Persuasion/interest stage.
3. Decision/evaluation stage.
4. Implementation/trial stage.
5. The confirmation/adoption stage.

Kaminski (2011) outlined some of the possible barriers that could occur during the change process. These barriers must be addressed before the change can occur:

- Orientation: Some of the stakeholders may not be familiar with or lack interest in the project issue.
- Insight: Some of the stakeholders may lack the knowledge and education to understand the need for the change.
- Acceptance: Some of the stakeholders may possess negative attitudes toward the change, or they are not ready to change. They are comfortable with the status quo.
- Change: Some of the stakeholders may delay or refuse to implement the change.

The DOI is an ongoing process that begins on day one of the project. The DOI allows the stakeholders who are in favor of and against the project change to be recognized at the start of the project. This enabled me as the project leader to work with the project champions and early adopters to develop strategies and methods to convince

the resisters to accept the change. Based on the evidence-based findings of this project, the best time to refer OIALBPPs to PT in order to return these patients to FDW as soon as possible was determined. Gaining the support and acceptance from all of the stakeholders was needed in order for the implemented change to be sustained within the practice setting. DOI theory was utilized in an observational project to determine whether the use of a theory increases guideline adherence. Harting, Rutten, Rutten & Kremers, (2009) found the DOI framework to be a useful tool for properly structuring focus group interviews, systematically analyzing collected data, and determining if supplementary interviews would be necessary to cover the DOI process (Harting et al., 2009). As the project leader, I believe the DOI framework aided the project champions and team members to develop strategies to overcome barriers to implementing the results into practice.

Significance of the Project

I was unable to uncover any evidence-based studies or papers that addressed the best time frame to refer OIALBPPs to PT in order to return them to FDW as soon as possible. I believe this project's findings provide needed and important information to organizational and community stakeholders, human resource managers, employers, insurance carriers, occupational health care providers, physical therapists, nurse case managers, lawyers, community members, and interested patients and families members. The findings of this project may aid in returning OIALBPPs to FDW sooner. This project's findings may have a positive effect on the financial burden that absenteeism and presenteeism places on the patient and employers (Mitchell & Bates, 2011). Returning

OIALBPPs to FDW sooner may also decrease work injury claims duration, decrease health care costs, decrease loss of employee wages, decrease health care provider visits, decrease invasive treatments, improve the quality of life for the patient, and decrease the prolonged use of medications.

Implication for Social Change

This project may promote a positive social change within the disciplines of health care and industry. Utilizing these results from the project's evidence-based findings may assist health providers to return their patients to FDW as soon as possible. The high economic burden associated with LBP is attributed directly to the high cost of health care and indirectly to lost income and productivity (Dagenais et al., 2010). The United States spends 30-50 billion health care dollars annually treating LBP (Chou & Chekell, 2010). Returning patients to FDW sooner may have a positive economic effect on patients, the health care system, private industry, insurers, employers, society, and the global work world. The Global Burden of Disease 2010 Project reported LBP to be the leading cause of global disability, and sixth in overall burden of global illness (Hoy et. al., 2014). Utilizing evidence-based methods to return OIALBPPs to FDW sooner may aid in reducing the global burden of OIALBP.

Definitions of Terms

Acute low back pain (ALBP): Pain that occurs between the lower posterior rib cage and buttock that is typically present for less than four weeks. The pain may radiate down the lower limbs, and neurological signs may be present as well.

Chronic low back pain (CLBP): Pain that occurs between the lower posterior rib cage and buttocks that persists longer than three months.

DART: An acronym that stands for the following: (a) days away from work, (b) restricted work duty, or (c) transfer to another job after a work related injury.

Full duty work (FDW): The job that the patient was performing before the injury to which they can return without any restrictions.

Standard: A statement that defines a function, activity, process, or structure that is followed by health care providers, staff, and organizations to provide quality care and services for their patients.

Work restrictions: Employment activities that health providers recommend the employee avoid while recovering from an injury or illness.

Absenteeism: Missing days of work due to an illness or injury.

Presenteeism: Performing work duties in a restricted, less productive manner due to injury or illness.

Physical therapy: A branch of rehabilitative health care that utilizes specially designed exercises and equipment to assist injured patients in regaining or improving their physical abilities.

Occupational health care provider: A provider of health care services and treatments to injured employees. A major role of the occupational health care provider is to evaluate the interaction between work and health (American College of Occupational and Environmental Medicine [ACOEM], 2015).

Occupational isolated acute low back pain patients (OIALBPPs): Patients who experiences pain that occurs between the lower posterior rib cage and buttock. The onset of pain occurs while the patient is on the job, on the job's work site, or the patient ascribes the pain to an event or activity that happened on the job but does not involve a traumatic mechanism.

Oswestry Disability Index (ODI): A low back functional outcome tool derived from the Oswestry Low Back Pain Questionnaire that is considered the gold standard used by clinicians and researchers to quantify disability for low back pain.

Isolated non traumatic low back injuries: Spontaneous injuries that are caused by overexertion, sprains, and strains, and do not involve a traumatic mechanism such as slips, trips, falls, assaults, multiple trauma, or machine and vehicular accidents.

Years of life lost (YLL): Years of life lost due to premature mortality (Buchbinder et al., 2013).

Years lived with disability (YLD): The number of years lived with a disability.

Assumptions and Limitations

Assumptions

Statements that lack scientific testing but are considered to be true are classified as assumptions (Grove, Burns, & Gray, 2013). The following were the assumptions related to this project.

- The abstracting occupational health care providers accepted a uniform definition of OIALBP.

- Data abstracted by the health care providers was accurate with regard to (a) the patients having received PT, (b) initial start date of PT, (c) date of birth, (d) injury date, and (e) date of return to FDW.
- All OIALBPPs' charts were available for abstraction.
- OIALBPPs data was entered into the electronic database correctly.
- Correct ICD 9 codes were chosen at the time of initial provider evaluation.
- OIALBPPs actually returned to FDW on the stated date ordered by the health care provider.
- OIALBPPs were honest in stating their LBP was related to their work.

Limitations

Limitations are defined as restrictions or problems that may decrease the generalizability of the findings.

- The excluded patients may have received PT through self-referral, chiropractic, or from outside of their company health provider panel, a classification error.
- OIALBPPs may have decided to delay PT after provider evaluation, despite the intent of the ordering health care provider.
- Patients who delayed presenting to occupational care could have had any combination of DART or full duty prior to starting PT.
- Results obtained from this project may not be generalizable to other health care settings due to the age, sex, injury severity, and occupational mix of the patients reviewed.

Summary

Section 1 lists the research questions on how receiving early PT affects time to FDW and whether delaying PT leads to failure to return to FDW sooner. PT's effect on injury severity and demographic differences will be analyzed and evaluated. Section 1 also provided a brief overview of the burden that OIALBP places on employees, their families, employers, stakeholders, the United States health care budget, and the global working world.

Section 2: Review of the Scholarly Literature

Introduction

The purpose of this project was to determine the ideal time to refer OIALBPPs to PT in order to return them to FDW sooner. The project's findings were incorporated into the organization's OIALBP standard. An in-depth search of the literature was conducted to uncover scholarly information used to determine what is the ideal time for referring OIALBPPs to PT in order to return them to FDW sooner. This section of the project examines the epidemiology of OIALBP, incidence and prevalence, economic impact, risk factors, the effects of physical therapy on OIALBPPs, and the theoretical framework that was used to guide the clinical practice change.

Literature Search Strategy

A literature search was conducted for evidence-based peer reviewed articles, studies, papers, books, dissertations, and theses related to the project's subject. Google, Google Scholar, MEDLINE, ProQuest, the Cochrane database, and Web of Knowledge (WoK) were the search engines utilized to conduct the literature search. Articles dated from 2009 to 2015 were extracted for examination. The following search terms were used to guide the search: *definition, prevalence, incidence, isolated, absenteeism, presenteeism, occupational, acute, cost, low back pain, work related, job related, standard, guideline, early, physical therapy, delayed, return to work, full duty work, occupational care, health provider, employee, employer, lifting, sitting, twisting, strain, sprain, hurt, out of work, disability, claim, burden, impairment, socioeconomic,*

insurance, worker, compensation, medical, company, productivity, and global. The use of Boolean terms “and” and “or” were used to broaden the search.

Epidemiology of Low Back Pain

LBP was a major public health problem for the western world during the second half of the 20th century. Today LBP has become a worldwide public health issue. LBP imposes an enormous socioeconomic burden around the world (Balagué, Mannion, Pelise & Cedraschi, 2012; Costa-Black, Loisel, Anema, & Pransky, 2010). LBP is classified as the leading cause of global disability surpassing 290 other health conditions. LBP was responsible for an estimated 58.2 million years lived with a disability in 1990. By 2010 the estimated total of years lived with a disability had increased to 83 million (Buchbinder et. al., 2013).

Incidence and Prevalence

LBP is a common and disabling MSD found to have a high prevalence in the working-age population (Berestnev, Moffitt, Vancil, & McKenzie, 2014; BLS, 2014; Hoy et. al., 2010; Hoy et. al., 2014; Wai, Roffey, Bishop, Kwon, & Dagenais, 2010; Waterman et al., 2012). Axén & Leboeuf-Yde (2013) described LBP as a recurrent condition that may be persistent at times (Axén & Leboeuf-Yde, 2013). In 2009 the United States Department of Labor reported that 50% of the MSDs were related to back injury cases. In 2009 the United States civilian workforce was comprised of nearly 140 million workers (U.S. DHHS, 2010). It was reported that each case requires on average seven days to return to work. The 2010 Bureau of Labor Statistics classified LBP as one of the most prevalent occupational MSDs in the United States (BLS, 2014). An estimated

80% of persons who experience LBP will have a recurrence within one year. (Hoy et. al., 2010; Patrick et. al., 2014). Out of the 291 conditions studied in the GBD 2010 study, LBP ranked the highest, and was ranked number six in overall disability adjusted life years (DALYs, Hoy et. al., 2014). LBP is the fifth most common condition that prompts individuals to seek medical care (Chou & Chekelle, 2010). According to Hoy et al. (2012), LBP is the most common cause of job-related disability and a leading contributor to missed work. There were 1.6 million injuries reported to the NIOSH in 2013. These were reported due to the occurrence of (a) days away from work, (b) restricted work duty, or (c) transfer to another job (DART) after a work related injury. MSDs accounted for 33% (528,000) of reported injuries. Back injuries make up 11.5% (185,000) of DARTs. LBP injuries make up 17.5% of injuries involving days away from work, with a median number of days out of work equaling eight. Nearly 65% of work related low back injuries are in the subset of isolated nontraumatic overexertion, sprains, and strains that do not involve slips, trips, falls, assaults, multiple trauma, or machine and vehicular accidents (NIOSH, 2013). Prevalence estimates as well as risk factors may differ based on how LBP is defined (Balagué, et. al., 2012). LBP, when defined as pain that lasts at least one day, is reported to have a prevalence of 45%, and represents 8% of persons requiring sick leave (Balagué, et. al., 2012).

Nontraumatic low back injuries represent 7.5% (120,000) of DARTs (BLS, 2014). In 2008 a total of 244,150 cases non-fatal back injuries were reported to the National Safety Council (NSC) from private sector employers (NSC, 2011). Individuals aged 45 to 65 years of age are considered to have the greatest risk of developing LBP (Chou &

Chekelle, 2010). Work is a very important contributing factor to a person's health.

Healthy People 2020 health promotion and disease prevention objectives for occupational health calls for a reduction of job related injuries. Job related injuries lead to increased medical treatments and absenteeism related to overexertion or continuous motion. Job related injuries could cause injured LBP employees to be assigned to restricted job activities (Healthy People 2020, 2015).

Definition of Occupational Isolated Acute Low Back Pain

The search of the literature did not uncover a standardized definition related to OIALBP. The term nonspecific low back pain is used interchangeably in the literature with nontraumatic low back pain. Balagué et al. (2012) defines nonspecific low back pain as not attributed to any known pathology. For the purpose of this project, OIALBP is defined as acute LBP that occurs or is noticed by the employee while carrying out their work duties or shortly after completing them. The injured employee reports acute pain that develops between the lower posterior rib cage and the buttocks. The pain may extend down one or both of the lower extremities. The person may or may not exhibit numbness or tingling of the lower extremities. The presence of any type of external trauma applied to the employee's body would exclude the diagnosis of occupational isolated acute low back pain. These excluded traumas would include assaults, blows to the back, slips, trips, falls, multiple traumas, machine and vehicular accidents.

Disability

Persons suffering from LBP experience an increase in their health care utilization, health care costs, and lost workdays (Deyo, 2011). LBP is the leading cause of global

disability (Hoy, et. al., 2014). The risk of becoming permanently disabled is related to the length of time employees are absent from their jobs. Persons who are absent from work for six months have only a 50% chance of returning to any work. If they are absent for one year they have only a 25% chance of returning to any work, and if they are absent for two years the BLS predicts that they will never return to any work (BLS, 2014; Rupe, 2010). Costa-Black et al. (2010) claim that long periods of absenteeism could increase the chance that the injured employee will go on to live a poor quality of life. Costa-Black et al. also reports that long periods of absenteeism could cause the employee to become permanently disabled. The primary focus of many health care providers is to treat the injury versus treating the total person. Returning the LBP patient to FDW as soon as possible could prevent the employee from becoming depressed or fixated on their LBP (Costa-Black et. al., 2010). Health care providers could benefit employees by making return to work (RTW) a part of their treatment plan when caring for the LBP patient.

Economic Impact

The high economic burden associated with LBP is attributed directly to the high cost of health care, and indirectly to lost income and productivity (Dagenais et al., 2010). In 2008 a total of 244,150 cases of nonfatal back injuries were reported to the National Safety Council (NSC) from private sector employers. The NSC estimated the total cost of occupational injuries to be \$117 billion. Nonmedical costs related to lost productivity, administrative expenses, and employer costs account for 82% (\$96 billion) of the total expenses incurred (NSC, 2011). Annually the United States spends 30-50 billion health care dollars treating LBP (Chou & Chekelle, 2010; Waterman et al., 2012). It is estimated

that occupational LBP absenteeism and treatments cost 100 billion dollars annually. LBP is said to be a huge part of the estimated 20 billion dollars paid out in compensation claims (BLS, 2014). LBP places a huge burden on the United States' health care budget and is the leading contributor for worldwide disability (Vos, et. al., 2012).

Risk Factors

Activities known to cause OIALBP are: bending, carrying, lifting, pushing, pulling, stooping, reaching, sitting, twisting, and turning. Working at a rapid pace, repetitive motions, insufficient recovery time, continuous vibration, and poor postures have also been identified as occupational risk factors for developing LBP (Driscoll et. al., 2014; Ramdan, Hashim, Kamat, Mokhtar, & Asmai, 2013). LBP may be caused by one risk factor or in combination with several risk factors (Driscoll, et. al., 2014). A cross sectional project was conducted among the Chinese occupational population, $N= 7,200$, made up of 3,600 randomly sampled cases and 3,600 controls. The results of this project suggest that bending and/or holding the neck forward for long periods are leading causes of LBP (OR = 1.408), followed by bending with the trunk (OR=1.340) and repetitive jobs (OR = 1.340). Allowing workers to take breaks is viewed as a preventive measure against developing LBP (Li et. al., 2012). Poor posture, improper use of body mechanics, heavy lifting, job dissatisfaction, and increased job demands were all identified as being risk factors associated with LBP in hospital health care providers. There is a greater prevalence of LBP in hospital workers compared to the general working public. This is related to the physical and emotional demands placed on hospital employees (Wong, Teo & Kyaw, 2010). LBP in persons under 45 years of age is a common condition among

office workers. Risk factors for LBP in this working population are multifactorial. Long periods of sitting, poor posture, and prolonged forward bent positions predispose office workers to LBP (Janwantanakul, Pensri, Moolkay, & Jiamjarasrangsi, 2011).

Physical Therapy

The American Physical Therapy Association (APTA) views the terms physical therapy, physiotherapy, physical therapist, and physiotherapist as being synonymous (APTA, 2015). For the purpose of this project the term physical therapy (PT) was used. The role of PT is to manage movement dysfunction, restore, and aid the patient to function at an optimal physical level. Preventing the patient's symptoms from progressing or causing further disabilities is one of the core reasons for ordering PT for OIALBPPs.

Worldwide 50-80% of people are affected by LBP at some point in their life. Many of the LBP symptoms with which persons suffer are resolved with minimal or no medical care interventions. It was also reported that as many as one third of persons suffering from LBP go on to have moderate to severe pain one year after reporting the initial episode of LBP (Whitfill et. al., 2010). Bach and Holten (2009) recommend ALBP patients stay active, RTW as early as possible, take acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDs), and start PT within one to two weeks if LBP symptoms do not improve. A retrospective cohort project of 439,195 patients who received treatment for LBP was conducted over two years. The researchers compared those who received PT less than four weeks from pain onset to those who received PT greater than three months from onset. The results of this project revealed a significant reduction in

odds of having lumbosacral injection, lumbar surgery, and ongoing health care visits in patients who received PT less than four weeks from the start of LBP (Gellhorn, Chan, Martin & Friedly, 2012). A retrospective cohort project was conducted ($N=32,070$) to examine the timing and content of PT and subsequent health care utilization and costs in newly diagnosed occupational LBP patients who received PT within 90 days of their initial complaint of LBP (Fritz, Childs, Wainner & Flynn, 2012). The patient's data was extracted from an employer sponsored health plan national database. Early PT was defined within this article as receiving PT within 90 days of the initial health care visit. The PT utilization was 7.0%. Early PT significantly decreased the risk of advanced imaging, OR = 0.34, 95% confidence interval (CI) [0.29, 0.41], additional health providers visits, OR = 0.26, 95% CI [0.21, 0.32], surgery, (OR = 0.45, 95% CI [0.32, 0.64], injections, OR = 0.42, 95% CI [0.32, 0.64], and opioid medications OR = 0.78, 95% CI: [0.66, 0.93] when compared to persons receiving delayed PT. The total medical cost for patients who received early PT was found to be \$2,736.23 lower, 95% CI [\$1,810.67, \$3,661,78].

Fritz et al., concluded that patients who receive early PT referrals reduce their number of health care visits in comparison to those who delay PT greater than 90 days (Fritz et al., 2012). In contrast, a Cifuentes, Willets, & Wasiak (2011) project concluded that providing PT or physician services to work related LBP patients was associated with a higher disability recurrence compared to chiropractic services or no treatment.

There is a noted gap in the literature in regard to the effects PT plays on returning OIALBPPs to FDW sooner. This project analyzed retrospective medical data on

OIALBPPs in order to determine the ideal time to refer OIALBPPs to PT in order to return them to FDW as soon as possible.

Theoretical Frameworks

Change can be extremely difficult. Persuading people to change will not occur until they let go of the status quo. Letting go of the old ways of doing things can cause people to feel threatened and uncomfortable (Zaccagnini & White-Waud, 2011). The DOI framework was used to guide the project change into the practice.

Diffusion of Innovation Theory

At the start of a project only a few stakeholders may be open to a new idea or change. Out of curiosity and the desire to try new things, *innovators* are usually the first persons to accede to the change. *Early adopters* are the next to accept it. Their reason for complying is based on the innovation's attributes. *Early majority* tend to cooperate because a critical mass of colleagues has endorsed the new idea or change. The last to concede are the *late majority*. They usually conform due to an imitative effect. The imitative effect relates to persons who perceive a feeling of social pressure to accept the change. Innovators and champions are used to spread the positive benefits of the change to other stakeholders. The model stresses the importance of ongoing open communication and stakeholder involvement to move forward and sustain the change. The DOI theory is based on a five-stage adoption progress (Kaminski, 2011).

- Knowledge/Awareness Stage: During this stage, stakeholders are introduced to the proposed innovation.

- Persuasion/Interest Stage: During this stage, stakeholders become interested in the innovation and begin to seek out more information about the innovation.
- Decision/Evaluation Stage: During this stage, the stakeholders agree to allow the innovation to be tested within the practice setting.
- Implementation/Trial Stage: The innovation is put into use.
- Confirmation/Adoption Stage: Full and continued use of the innovation is accepted by all of the stakeholders.

Summary

Current best evidence data supports the fact that LBP is a growing and expensive global work force health issue. A gap in the literature was noted regarding data, articles, and studies that address the best time to refer OIALBPPs to PT. It was noted that no standard universal definition exists to define early PT. The epidemiology of LBP was discussed, as well as the risk factors related to LBP. The huge economic impact of LBP and the role that OIALBP has on disability were discussed. PT's role in caring for OIALBPPs was explained. Studies for and against referring LBP patients to PT were cited. DOI theory was explained in detail. The chosen theoretical framework aids in guiding the evidence-based change into the practice setting in an effective, organized manner. I believe this is the first project of its kind that addressed the best time frame in which to refer OIALBPPs to PT in order to return them to FDW faster. Section three will introduce the project's design method, the target population, and the methods that were utilized to collect and analyze the data, as well as the project's evaluation plan.

Section 3: Approach

Introduction

Section three of the project introduces the project's design, sampling methods, data collection, and data analysis techniques utilized by the project leader in the results section of the project. The project's evaluation plan is introduced and explained.

Program Description

Relevance

Worldwide, LBP remains the number one cause of YLDs. Vos et al. (2015) estimates the mean YLDs to be greater than 72 million. The evidence-based findings from this project became an OIALBP standard that addresses the best time frame to refer the organization's OIALBPPs to PT. The findings could assist in lowering DARTs, medical care, and worker compensation costs. The injured employee may be able to RTW sooner, preventing further loss of wages (Mitchell & Bates, 2011). Being able to identify an ideal time frame in which to refer OIALBPPs to PT may prevent ALBP from progressing to chronic back pain, enabling OIALBPPs to live a better quality of life. Employers may benefit from increased productivity, increased company revenue, and lower insurance costs (van Duijn et al., 2010, Fritz et al., 2012, Iles & Wyatt, 2013, Mitchell & Bates, 2011). Health care workers and researchers could replicate this project or pose new questions related to OIALBP. Results of this project may contribute to the body of evidence-based nursing and medical knowledge.

Targets

Occupational health care providers, administrators, management, front-end workers, PT, and OIALBPPs will all need to understand and accept the reason why change is needed. Top and bottom level stakeholders will have to work together and show enthusiastic support for the change in order for the change to be successfully implemented and sustained within the practice setting.

Outcomes

Stakeholders had to be well educated and accepting of the change for the change to be implemented and sustained within the practice setting. Easily understood common language aided in educating stakeholders. Meeting individually with each stakeholder enabled the project leader to know that they understood the roles and contributions of each stakeholder. Continuous evaluation of the project enable the aspects of the project that were working, as well as those that were not working, to be identified early. The team leader kept the stakeholders engaged and up to date on the project status weekly.

Activities

Upon the Walden's Institutional Review Broad (IRB) approval (Appendix), the project leader obtained the protected secured flash drive with the subjects' six digit codes, and abstracted data, from the organization's medical director, and analyzed it. As project leader, I maintained open communication with stakeholders by holding biweekly update meetings, sent out weekly project reports to the leadership, and was available to answer questions quickly. Questions, suggestions, concerns, and feedback were encouraged and welcomed from all stakeholders. By leading by example, I functioned as a

transformational leader. All stakeholders were listened to and treated with respect. Open and honest lines of communication kept the stakeholders involved and interested in the project. Providing frequent project updates and findings also aided in keeping the stakeholders engaged.

Stakeholders will have to be willing to deviate from the established norms and be open to learning about the benefits of the change in order to support and sustain the change. Developing and implementing methods to accomplish this task was a primary goal of the team leader. As project leader, I utilized the DOI framework to guide the stakeholders through this process.

Design and Methodology

Project Design

A retrospective cohort project design (RCS), known also as a historical cohort project design, was considered the best project design to use to explore the project's research questions. An RCS allowed the organization's occupational health care providers to identify a group of people who have experienced a particular event. Cohorts are defined as samples in time-dimensional studies within the field of epidemiology. The cost of conducting an RCS is less than that of prospective cohort studies and case control studies (Grove et. al., 2013).

The RCS permitted the health care providers to define a specific population over a stated time period in order to attain primary measures of association. The RCS also allowed the health providers to examine past medical records collected up to the present time. OIALBPPs are the identified cohort group of this project. All work related low back

injuries with the ICD-9-CM codes 724.2, 847.2, and 846.0, that presented to the organization between January 1, 2009 and December 31, 2015 were reviewed by the health providers. A total of 1,495 charts were reviewed. A total of 932 OIALBPPs were identified and abstracted by the health providers.

RCS designs have been utilized in several LBP studies. Knox et al. (2014) conducted a retrospective cohort project to determine the incidence rate and demographic risk factors of LBP in an ethnically diverse and physically active population of U.S. military vehicle operators. Fritz et al. (2012) conducted a retrospective cohort project to describe PT utilization following primary care consultation for LBP. The association between the timing and content of PT and subsequent health care utilization and cost were also examined. Gellhorn et al. (2012) conducted a retrospective cohort project to evaluate the relationship between early PT for ALBP and subsequent use of lumbosacral injections, lumbar surgery, and frequent physician office visits for LBP. Ivanova et al. (2011) conducted a retrospective project to assess the actual practice patterns of imaging, noninvasive therapy, medication use, and surgery in LBP patients, and compare their cost to those of matched controls without LBP. Crow and Willis (2009) conducted a retrospective project to estimate the cost of standard care compared to standard care plus osteopathic manipulative treatment for ALBP of less than 6 months duration. Diaz-Ledezma et al. (2009) conducted a retrospective project to investigate the prevalence of ALBP as a cause of sick leave and the variables associated with longer work absence because of ALBP in Chile. It was also noted that none of the above studies utilized a standard operational definition of early PT.

Data Collection Methods and Design

All work related low back injuries with ICD-9-CM codes 724.2, 847.2, and 846.0 in the organization's medical database beginning January 1, 2009 and ending on December 31, 2015 were identified from the organization's electronic medical records (EMR) by the occupational health care providers, were combined, and the subset of OIALBPPs identified. There is no ICD-9-CM or ICD-10 code for this subset of patients. A total of 1,495 low back injuries were identified. Each record was reviewed for mechanism of injury. Out of this group, 932 (62%) were classified as OIALBPPs, 556 (37%) had traumatic low back injury, and 7 (1%) were exacerbations of chronic pre-existing low back pain already on permanent work restrictions pre-injury. Traumatic back and pre-existing chronic LBP injuries were excluded. The health providers abstracted 932 OIALBP records for date of birth, sex, date of injury, date of PT initial evaluation, date of return to full duty, age in years, date of occupational provider initial evaluation, and patient's occupation. A random six-digit number was assigned to each abstracted case. The project's research questions were used as the template for the research design.

1. In OIALBPPs, how does receiving early PT affect the length of time to return to FDW compared to delaying PT?
2. In OIALBPPs, does delaying PT lead to failure to return to FDW?
3. In regard to the effect on the length of time for OIALBPPs to return to FDW, are there any sex, age, occupational group, or injury severity differences in receiving early PT versus delaying?

As project leader, I created an Excel spreadsheet to answer research question 1. There were a total of 16 columns, 451 rows, each row represents an OIALPP who initiated PT and returned to FDW. This resulted in a total of 7,216 cells. Column A = case #, column B = date of birth (DOB), column C = male (M), column D = female (F), column E = date of injury (DAT INJ), column F = date of initial PT evaluation (DPT), column G = date of full duty work (DATE FD), column H = total days of full duty (TDOFD), column I = number of days from onset of LBP until physical therapy initial evaluation (OUPT), column J = age in years on date of injury (AAI), column K = date of occupational provider initial evaluation (DPE), column L = the number of days from occupational provider initial evaluation until physical therapy initial evaluation (PEPT), column M = the number of days from physical therapy initial evaluation until return to full duty (PTFD), column N = the number of days from occupational provider initial evaluation until return to full duty (PEFD), column O = the number of days from onset of low back pain until occupational provider initial evaluation (OUPE), column P = injured employee's occupation as classified under the BLS. The rows were numbered from 2 – 452. TDOFD was calculated by subtracting Date Injury from Date FD in the same number row using Excel DAYS functions. OUPT was calculated by subtracting Date Inj from DPT in the same number row using Excel DAYS functions. AAI was calculated by subtracting DOB from Date Injury in the same number row using Excel YEARFRAC function. PEPT was calculated by subtracting DPE from DPT in the same number row using Excel DAYS functions. PTFD was calculated by subtracting DPT from Date FD in the same number row using Excel DAYS functions. PEFD was calculated by subtracting

DPE from Date FD in the same number row using Excel DAYS functions. OUPE was calculated by subtracting Date Injury from DPE in the same number row using Excel DAYS functions. Column I, OUPT, was arranged in numerical order from the smallest to largest. Three rows were added between 9 and 10 days in the column I arrangement. In the first added row, the mean (μ) was calculated using Excel AVERAGE function, for the OUPT < 10 days group, for columns H, J, L, M, N, and O. In the second added row the standard deviation (SD) was calculated using Excel STDEV.P function, for the OUPT < 10 days group, for columns H, J, L, M, N, and O. In the third added row the confidence interval (CI) was calculated using Excel CONFIDENCE.NORM function, for the OUPT < 10 days group, for columns H, J, L, M, N, and O. Similarly, the same three added rows and calculations were performed on column I of the OUPT \geq 10 days group. Using Excel T.TEST function in a fourth row, the < 10 days group was compared with the \geq 10 days group for columns H, J, L, M, N and O. Skewness, kurtosis, and sample size needed was calculated for each column to confirm robustness of the data.

Similarly, an Excel spreadsheet was created to answer research question 2. Two tables were created, an observed table and an expected table with 4 columns and 3 rows. Column A = category, column B = OUPT < 10, column C = OUPT \geq 10 days, column D is the total number. The first row was the return to work, the second row was maximally medically improved, and the third row was the total number. The observed sample numbers were placed into their respective cells in the observed table. The expected numbers were calculated by multiplying the row total by the column total at each intersecting cell, followed by the result being divided by the expected table's grand total.

Using Excel CHISQ.TEST function, the observed and expected tables were compared, and a chi square value was obtained. Plugging this chi square value into the Excel CHISQ.DIST.RT function gave the probability result.

Research question 3 was addressed utilizing the same Excel spreadsheet format and calculations as were used to answer research question 1. Prior to arranging column I (OUPT) from smallest to largest, the data was arranged by sex (Table 6), age bracket (Table 7), and occupational group (Table 8) respectively.

Protection of Human Subject Rights

The clinic's medical director worked with two other occupational health providers to abstract the data from the EMR. Each subject was assigned a six-digit code number in order to protect the patients' anonymity. The medical director secured the master list of the subject's names and six digit codes in a combination safe within his private office. A secure flash drive containing the subjects' six digit codes and the data collected from the EMR was locked in a locked box within a locked drawer within the director's office. The code to open the safe was only known by the medical director. The chosen project design did not require the health providers to conduct follow up interviews or collect any follow up data directly from the subjects, their family members, friends, or employers. After IRB approval, I was given access to the secure flash drive that contained the subjects' six digit codes and data that the health providers abstracted from the subjects' EMR. The review and analysis of the data was conducted on a secure company computer located within the medical director's office. All collected data was stored on a secured flash drive and given to the medical director at the end of the day to be locked away. At the

completion of the project, the flash drive, the master list of the subjects' names and six digit codes were destroyed by the medical director. One or more of the data collectors witnessed the destruction of the flash drive and collected data.

Data Demographics

The Bureau of Labor Statistics Classification of nonfatal occupational injuries 2013 report (BLS, 2014) was used as the guide to classify low back injured patients into the following occupational groups:

- Health care $N= 262$: including certified nursing assistants = 91(35%), registered nurses = 41(16%), personal care aides = 74(28%), paramedics and emergency medical technicians = 10(4%), home health aides = 10(4%), licensed practical nurses = 7(3%), psychiatric aides = 2(1%), nonfarm animal caretakers = 2(1%), physical and social science = 3(1%), health care practitioners and technical occupations = 13(5%), and health care support occupations = 9(3%).
- Laborers $N= 111$: including laborers = 71(64%), construction laborers = 8(7%), landscaping and grounds keeping workers = 8(7%), shipping receiving and traffic clerks = 18(16%), and first-line supervisors of construction trades = 6(5%).
- Commercial Driving $N = 40$: includes heavy & tractor-trailer = 11(28%), light truck & delivery = 19(48%), driver/sales workers = 1(3%), industrial truck & tractor operators = 7(18%), and school bus drivers = 2(5%).

- Retail and Food Services $N = 117$: includes stock clerks & order fillers = 42(36%), retail salespersons = 15(13%), first line supervisors of retail sales workers = 6(5%), cashiers = 7(6%), food preparation workers = 9(8%), fast food & serving workers = 12(10%), institution cooks = 2(2%), customer service representatives = 2(2%), first line supervisors of food preparation & serving workers = 2(2%), general office clerks & administrative assistants = 8(5%), dining room & cafeteria attendants = 4(3%), restaurant cooks = 5(4%), and business financial operations occupations = 3(3%).
- Maintenance, Repair, Cleaning & Installing $N = 165$: includes janitors = 18(11%), general maintenance & repair workers = 29(18%), maids & housekeeping = 15(9%), automotive service technicians = 9(5%), plumbers, pipefitters, & steamfitters = 7(4%), carpenters = 10(6%), electricians = 2(1%), heating air conditioning & refrigeration mechanics & installers = 5(3%), installation workers = 18(11%), telecommunication line installers & repairers = 3(2%), water & wastewater treatment plant and system operators 6(4%), bus & truck mechanics and diesel engine specialists = 11(7%), telecommunication equipment installers & repairs = 4(2%), operating engineers and other construction equipment operators = 19(12%), highway maintenance workers = 3(2%), painters & finishers = 4(2%), and first line supervisors of housekeeping & janitorial = 2(1%).
- Production $N = 148$: includes production workers = 33(22%), assemblers & fabricators = 20(14%), cargo freight agents = 4(3%), packers & packagers =

3(2%), inspectors & surveyors = 6(4%), machine operators = 62(42%), and welders = 20(14%).

- Protective Services $N=17$: includes firefighters = 2(12%), police & sheriffs patrol officers = 3(18%), corrections officers = 7(41%), security guards = 4(24%), and protective service occupations = 1(6%).
- Management & Teachers $N=72$: teacher assistants = 6(8%), managers = 48(67%), designers = 2(3%), management occupations = 3(4%), information technology occupations = 2(3%) engineers = 1(1%), social workers = 1(1%), and teachers = 9(13%).

Table 1 displays the demographics of occupational isolated acute low back pain patients. Out of the 932 OIALBPPs 57% were male and 43% were female. OIALBPPs age 45 - 54 years made up the largest group equaling 27%, followed by the 25 - 34 age group equaling 24%, then 35 - 44 years at 22%. Health care was noted to be the largest occupational group in this project equaling 28%. Maintenance, repair, cleaning, and installing made up 18%. Production made up 16%. Eighty-four percent of OIALBPPs returned to FDW, 13% were lost to follow up (LTF), and 3% were maximally medically improved (MMI) on permanent work restrictions (Table 1).

Physical therapy utilization per outcome is displayed in Table 2. There was no significant difference in PT utilization between RTW, LTF, and MMI groups, $X^2 = 3.10$, $df = 2$, $p = 0.21$ (Table 2). However there were significant differences in PT utilization in certain occupational groups (Table 3). Physical therapy utilization was greater than

expected in health care and laborers. Physical therapy was significantly underutilized in retail food workers, and managers & teachers, $X^2 = 39.66$, $df = 7$, $p < .001$.

Table 1

Demographics of Occupational Isolated Acute Low Back Pain Patients

Parameter	Category	RTW	LTF	MMI	Total
Age	17-24	97(12)	15(13)	1(4)	113(12)
	25-34	189(24)	31(26)	4(14)	224(24)
	35-44	172(22)	24(21)	8(29)	204(22)
	45-54	209(27)	36(31)	7(25)	252(27)
	<u>>55</u>	<u>120(15)</u>	<u>11(9)</u>	<u>8(29)</u>	<u>139(15)</u>
	Total	787(100)	117(100)	28(100) ^a	932(100)
Sex	Male	445(57)	63(54)	20(71)	528(57)
	<u>Female</u>	<u>342(43)</u>	<u>54(46)</u>	<u>8(29)</u>	<u>404(43)</u>
	Total	787(100)	117(100)	28(100)	932(100)
Occupation	Health care	228(29)	29(25)	5(18)	262(28)
	Laborer	96(12)	10(9)	5(18)	111(12)
	Com Driving	31(4)	5(4)	4(14)	40(4)
	Retail Food	91(12)	25(21)	1(4)	117(13)
	Maint Repair	139(18)	23(20)	3(11)	165(18)
	Production	128(16)	12(10)	8(29)	148(16)
	Protective	11(1)	5(4)	1(4)	17(2)
	<u>Manageteach</u>	<u>63(8)</u>	<u>8(7)</u>	<u>1(4)</u>	<u>72(8)</u>
	Total	787(100)	117(100)	28(100) ^a	932(100) ^a

Note. Results given as $N(\%)$. RTW is return to work full duty, LTF is lost to follow up, MMI is maximally medically improved on permanent work restrictions. Com Driving is commercial driving, Maint Repair is maintenance, cleaning, installing, and repair, Retail Food is retail and food service, Manageteach is management and teaching.

^aTotals may add to greater than 100 due to rounding.

Table 2

Physical Therapy Utilization per Outcome^a

Outcome	PT	No PT	Total
RTW	451(86)	331(83)	782(85)
LTF	59(11)	55(14)	114(12)
<u>MMI</u>	<u>16(3)</u>	<u>11(3)</u>	<u>27(3)</u>
Total	526(100)	397(100)	923(100) ^b

Note. Results given as *N*(%). RTW is return to work full duty, LTF is lost to follow up, MMI is maximally medically improved on permanent work restrictions.

^a $\chi^2= 3.10$, $df= 2$, $p = .21$, No significant difference in PT utilization between outcome groups. ^bTotal of 9 patients in which PT status could not be determined.

Table 3

Physical Therapy Utilization by Occupational Group

Occupation	PT	No PT	Total
Health care	159(30)^{a***}	102(26)	261(28) ^c
Laborer	70(13)^{a***}	39(10)	109(12) ^c
Com Driving	23(4)	16(4)	39(4) ^c
Retail Food	60(11)	57(14)^{a***}	117(13)
Maint Repair	94(18)	68(17)	162(18) ^c
Production	82(16)	66(17)	148(16)
Protective	8(2)	8(2)	16(2) ^c
<u>Manageteach</u>	<u>30(6)</u>	<u>41(10)^{a***}</u>	<u>71(8)^c</u>
Total	526(100)	397(100)	923(100) ^{b,d}

Note. Results given as *n*(%) of occupational group. PT is physical therapy initial evaluation, No PT is no physical therapy performed. Maint. Repair is maintenance, cleaning, installing, and repair, Com Driving is commercial drivers, Manageteach is management and teaching.

^a $\chi^2= 39.66$, $df= 7$, $>$ expected. ^bTotal adds to $>$ 100 due to rounding. ^cOccupational group had patient in which PT status could not be determined. ^dTotal of 9 patients in which PT status could not be determined.

*** $p < .001$

Data Analysis

Excel for Windows 2016 statistical package (Microsoft Corporation, Redmond, WA) was used to conduct the data calculations. Age at injury (AAI) in years was calculated using YEARFRAC function, and the mean years were calculated using Excel AVERAGE function. The number of days from injury onset until initial occupational provider evaluation (OUPE), number of days from onset until PT evaluation (OUPT), number of days from initial occupational provider evaluation until PT evaluation (PEPT), number of days from initial occupational provider evaluation until full duty (PEFD), number of days from initial PT evaluation until full duty (PTFD), and total days injury onset until full duty (TDOFD) were calculated using Excel DAYS function. The mean days from groups resulting from this data abstraction were calculated using Excel AVERAGE function. Groups' standard deviation was calculated using Excel STDEV.P function, and the 95% confidence intervals were calculated using the Excel CONFIDENCE.NORM function. The RTW, MMI, sex, age, injury severity, and occupation groups who initiated PT were evaluated using Excel T.TEST, which stands for student's t test, CHISQ.TEST, which stands for chi-square, and ANOVA, which stands for analysis of variance. The probability of a significant difference between these groups was set at 5% ($p < .05$)

Project Evaluation Plan

Project's Evaluation Purpose

The purpose of this project's evaluation was to analyze the retrospective patients' data collected by the organization's occupational health providers. The project's findings

were used to determine the ideal time for referring OIALBPPs to PT in order to return them to FDW as soon as possible. The findings were implemented into the organization's existing OIALBP standard.

Evaluation is defined as the examination of the worth, merit, or significance of an object. A problem is any set of organized activities supported by a set of resources to achieve a specific and intended result (U.S. DHHS, 2011). Evaluation findings should be used both to make decisions about program implementation and to improve program effectiveness. A program evaluation is an ongoing process conducted according to a set of guidelines. The program evaluation should serve a useful purpose, be conducted in an ethical manner, and produce accurate findings. The evaluation is used to make decisions about the program's implementation and also improve the program's effectiveness (U.S. DHHS, 2011).

Summary

Section three of the project introduced the project's design, sampling methods, data collection, and data analysis techniques utilized by the project leader in the results section of the project. The project's evaluation plan was introduced and explained. Subsequent sections discuss the findings, results, implications of the project related to the practice, future research, and social change. The strengths and limitations of the project are highlighted along with a self-analysis of the project leader.

Section 4: Findings and Recommendations

Introduction

The practicum site did not have an evidence-based time frame for referring their OIALBPPs to PT. This negatively impacted their ability to compete for industrial medicine contracts with employers. Having an OIALBP standard for referring to PT, with significantly improved outcomes, may improve their marketing efforts over their competitors.

Project Purpose

The project's purpose was to identify the most ideal time to refer OIALBPPs to PT, which allows them to return to FDW in the shortest amount of time. The findings would be used to create an evidence-based standard for referring OIALBPPs to PT. The standard would become part of the organization's existing OIALBP standard.

Practice Focused Questions

1. In OIALBPPs, how does receiving early PT affect the length of time to return to FDW compared to delaying PT?
2. In OIALBPPs, does delaying PT lead to failure to return to FDW?
3. In regard to the effect on the length of time for OIALBPPs to return to FDW, are there any sex, age, occupational group, or injury severity differences in receiving early PT versus delaying PT?

Sources of Evidence

All work related low back injuries from January 1, 2009, ending December 31, 2015, that contained ICD-9-CM codes 724.2 lumbago, 847.2 sprain of lumbar, and 846.0

sprain of lumbosacral were identified from the organization's medical data base by the occupational health care providers. The health providers found a total of 1,495 LBP injuries. Each record was reviewed for mechanism of injury, and traumatic back injuries were excluded. The health providers identified 932 OIALBP records. All 932 records were abstracted for date of birth, sex, date of injury, date of injury, date of return to full duty, age in years, date of occupational providers, initial evaluation, and occupation. A random six-digit number was assigned to each abstracted case.

Analytical Strategies

I analyzed the data and identified the best time frame to refer their OIALBPPs to PT using Excel for Windows 2016 statistical package for the calculations. Excel T.TEST, CHISQ.TEST, and ANOVA were used in the data analysis. Tables were designed and constructed in Excel using the results. The return to work, maximally medically improved (MMI), sex, age, injury severity, and occupation groups who initiated PT were evaluated using Excel T.TEST, CHISQ.TEST, and ANOVA functions. The probability of a significant difference between these groups was set at 5% ($p < .05$). I used T.TEST to look for a significant difference between two group means. CHISQ.TEST measures how much observed counts in a table diverge from expected counts. I used ANOVA to test the difference among the means of three or more groups. Tables were used to display demographic information related to sex, age, occupational group, PT utilization per outcome, PT utilization by occupational group, and return to work compare to onset of PT in these groups.

Findings and Implications

Results

Acute low back pain patients who receive physical therapy early after the initial episode were shown to use subsequent medical services less than those who delay physical therapy (Fritz, et. al., 2012; Gellhorn, et. al., 2012). The purpose of this project was to determine the time frame to refer OIALBPPs to PT in order to return them to FDW as quickly, and safely as possible. For the purpose of this project, early PT is defined as a PT initial evaluation that occurs less than 10 days after the date of back pain onset as reported to the workers compensation insurance carrier. Delayed PT is defined as a PT initial evaluation that occurred 10 days or greater after the date of back pain onset as reported to the workers compensation insurance carrier. The research questions posed in this project were answered. Research question 1 is as follows: In OIALBPPs, how does receiving early PT affect the length of time to return to FDW compared to delayed PT? There was a highly significant difference between the early and the delayed PT groups. The early group $\mu = 24.29$, $SD = 22.65$, 95% CI [21.89, 26.69] returned to FDW an average of 13.5 days sooner than the delayed group $\mu = 37.83$, $SD = 26.05$, 95% CI [32.96, 42.70], $p < 0.001$. Highly significant differences in the number of days from onset of low back pain until occupational provider initial evaluation (OUPE), and the number days from occupational provider initial evaluation until physical therapy initial evaluation (PEPT), was found between the early and delayed groups, $p < 0.001$ (Table 4).

Table 4

Early Versus Delayed PT Impact on TDOFD in OIALBPPs

Parameter	OUPT < 10 days, <i>n</i> = 341			OUPT ≥ 10 days, <i>n</i> = 110			
<u>Category</u>	<u>Mean</u>	<u>SD</u>	<u>95%CI</u>	<u>Mean</u>	<u>SD</u>	<u>95%CI</u>	<u><i>P</i></u>
TDOFD	24.29	22.65	[21.89, 26.69]	37.83	26.05	[32.96, 42.70]	<0.001
AAI ^a	40.00	11.94	[38.73, 41.27]	42.35	12.96	[39.93, 44.77]	0.09
PEPT	2.65	2.46	[2.39, 2.91]	10.68	11.05	[8.62, 12.74]	<0.001
PTFD	19.93	22.56	[17.54, 22.32]	20.04	19.67	[16.36, 23.72]	0.96
PEFD	22.50	22.72	[20.09, 24.91]	30.60	25.12	[25.91, 35.29]	<0.005
OUPE	1.79	1.86	[1.59, 2.06]	7.23	8.17	[5.70, 8.76]	<0.001

n = number in group, Mean = average number of days except where noted, SD = standard deviation, CI = confidence interval, *p* = probability, PT = physical therapy, TDOFD = total days off full duty, OIALBPP = occupational isolated acute low back pain patients, OUPT = number of days from onset of LBP until physical therapy initial evaluation, AAI = age in years at date of injury, PEPT = number of days from occupational provider initial evaluation until physical therapy initial evaluation, PTFD = number of days from physical therapy initial evaluation until return to full duty, PEFD = number of days from occupational provider initial evaluation until return to full duty, OUPE = number of days from onset of low back pain until occupational provider initial evaluation.

^aage in years on date of injury.

p = probability as calculated by Student t test.

Research question 2 is as follows: In OIALBPPs does delaying PT lead to failure to return to FDW? Yes, 69% of those OIALBPPs which failed to return to FDW had delayed PT compared to 22% of those who returned to FDW, a significant difference, $\chi^2 = 7.37$, $df = 2$, $p = < .01$ (Table 5).

Research question 3 is as follows: In regard to the effect on the length of time for OIALBPPs to return to FDW, are there any sex, age, occupational group, or injury severity differences in receiving early PT versus delaying PT? Yes, males who started PT < 10 days from onset of LBP returned to FDW an average of 11 days sooner, $\mu = 24.27$, SD = 24.11, 95% CI [20.96, 27.58] versus (vs.) ≥ 10 days $\mu = 35.41$, SD = 27.94, 95% CI [27.97, 42.54], $p = < .01$. Females who started PT < 10 days from onset of LBP returned

to FDW an average of 16 days sooner, $\mu = 24.32$, $SD = 20.28$, 95% CI [20.92, 27.72] vs. ≥ 10 days $\mu = 40.63$, $SD = 23.36$, 95% CI [34.22, 47.04], $p = < .001$. The males in the early PT group were significantly younger in years, $\mu = 39.68$, $SD = 11.87$, 95% CI [38.05, 41.31] vs. delayed PT group, $\mu = 44.98$, $SD = 10.95$, 95% CI [42.19, 47.77], $p = < .002$. There was no significant difference in age in early vs. delayed PT in females. In both males and females there was a highly significant difference in the number of days from onset of LBP until occupational provider initial evaluation between the early and delayed PT groups, $p = < .001$ (Table 6).

Table 5

Early PT Return to Work Versus Maximally Medically Improved

Parameter	OUPPT < 10	OUPPT ≥ 10	Total
RTW	341(78)	110(22)	451(100)
MMI	<u>5(31)</u>	<u>11(69)*</u>	<u>16(100)</u>
Total	346(77)	121(23)	467(100)

Note. Results given as $N(\%)$. RTW is return to work full duty, PT is physical therapy, OUPPT is number of days from onset of OIALBP until physical therapy initial evaluation, MMI is maximally medically improved on permanent work restrictions.

$\chi^2 = 7.37$, $df = 2$,

* $p = < .01$

The greatest impact of early PT was noted in employees 45- 54 years of age. Employees in this age range who started PT < 10 days from onset of LBP returned to FDW an average of 22.5 days sooner, $\mu = 22.97$, $SD = 16.35$, 95% CI [19.51, 26.43] vs. ≥ 10 days $\mu = 45.70$, $SD = 29.99$, 95% CI [34.39, 57.01], $p = < .001$. Significant differences were also noted in the ≤ 24 years and 25-34 years groups, but the sample sizes were small (Table 7).

Table 6

Early Versus Delayed PT Impact on TDOFD in OIALBPP by Sex

Male							
	OUPT < 10 days, <i>n</i> = 204			OUPT ≥ 10 days, <i>n</i> = 59			
<u>Category</u>	<u>Mean</u>	<u>SD</u>	<u>95%CI</u>	<u>Mean</u>	<u>SD</u>	<u>95%CI</u>	<u>P</u>
TDOFD	24.27	24.11	[20.96, 27.58]	35.41	27.94	[27.97, 42.54]	< .01
AAI	39.68	11.87	[38.05, 41.31]	44.98	10.95	[42.19, 47.77]	< 0.002
PEPT	2.41	2.55	[2.06, 2.76]	10.02	11.86	[6.99, 13.05]	< 0.001 ^b
PTFD	20.13	24.17	[16.81, 23.45]	18.36	21.05	[12.99, 23.73]	0.59
PEFD	22.41	24.19	[19.09, 25.73]	28.15	26.30	[21.44, 34.86]	0.14
OUPE	1.86	2.02	[1.58, 2.14]	7.25	5.97	[5.73, 8.77]	< 0.001
Female							
	OUPT < 10 days, <i>n</i> = 137			OUPT ≥ 10 days, <i>n</i> = 51			
<u>Category</u>	<u>Mean</u>	<u>SD</u>	<u>95%CI</u>	<u>Mean</u>	<u>SD</u>	<u>95%CI</u>	<u>P</u>
TDOFD	24.32	20.28	[20.92, 27.72]	40.63	23.36	[34.22, 47.04]	< 0.001
AAI ^a	40.48	12.03	[38.47, 42.49]	39.32	14.36	[35.38, 43.26]	0.61
PEPT	3.01	2.27	[2.63, 3.38]	11.45	9.97	[8.71, 14.19]	< 0.001
PTFD	19.63	19.91	[16.30, 22.96]	21.98	17.73	[17.11, 26.85]	0.44
PEFD	22.64	20.33	[19.24, 25.97]	33.43	23.36	[27.02, 39.84]	< 0.005
OUPE	1.69	1.59	[1.42, 1.96]	7.20	10.14	[4.42, 9.98]	< 0.001

n = number in group, Mean = average number of days except where noted, SD = standard deviation, CI = confidence interval, PT = physical therapy, TDOFD = total days off full duty, OIALBPP = occupational isolated acute low back pain patients, OUPT = number of days from onset of LBP until physical therapy initial evaluation, AAI = age in years at date of injury, PEPT = number of days from occupational provider initial evaluation until physical therapy initial evaluation, PTFD = number of days from physical therapy initial evaluation until return to full duty, PEFD = number of days from occupational provider initial evaluation until return to full duty, OUPE = number of days from onset of low back pain until occupational provider initial evaluation.

^aage in years at date of injury. ^bsmall sample size.

p = probability as calculated by Student T Test.

Table 7

Early Versus Delayed PT Impact on TDOFD in OIALBPP by Age

Category	OUPT < 10			OUPT ≥ 10			P
	Mean	SD	95% CI	Mean	SD	95% CI	
≤ 24 years		n = 41			n = 13		
TDOFD	21.68	19.52	[15.71, 27.65]	37.69	12.33	[30.99, 44.39]	< .002 ^a
PEPT	2.93	3.23	[1.94, 3.92]	8.92	7.99	[4.58, 13.26]	< .03
25-34 years		n = 83			n = 18		
TDOFD	26.08	28.95	[19.85, 32.31]	40.22	19.11	[31.39, 49.05]	< .02 ^a
OUPE	1.77	1.83	[1.38, 2.16]	4.00	2.81	[2.70, 5.30]	< .005
35-44 years		n = 87			n = 31		
TDOFD	23.59	16.04	[20.22, 26.96]	36.29	34.03	[24.31, 48.27]	0.06
OUPE	1.29	2.78	[0.71, 1.87]	5.48	5.58	[3.52, 7.44]	< .001
45-54 years		n = 86			n = 27		
TDOFD	22.97	16.35	[19.51, 26.43]	45.70	29.99	[34.39, 57.01]	< .001
PEFD	21.21	16.47	[17.73, 24.69]	37.67	30.07	[26.33, 49.01]	< .02
≥ 55 years		n = 44			n = 21		
TDOFD	27.32	31.33	[18.06, 36.58]	28.00	9.81	[23.80, 32.20]	0.96
PEPT	2.61	1.92	[2.04, 3.18]	6.19	3.85	[4.54, 7.84]	< .001
OUPE	1.84	2.00	[1.25, 2.43]	8.52	4.89	[6.43, 10.58]	< .001

n = number in group, Mean = average number of days, SD = standard deviation, CI = confidence interval, PT = physical therapy, TDOFD = total days off full duty, OIALBPP = occupational isolated acute low back pain patients, OUPT = number of days from onset of LBP until physical therapy initial evaluation, PEPT = number of days from occupational provider initial evaluation until physical therapy initial evaluation, PEFD = number of days from occupational provider initial evaluation until return to full duty, OUPE = number of days from onset of low back pain until occupational provider initial evaluation.

^asmall sample size OUPT ≥ 10

p = probability as calculated by Student t test.

When age groups were compared to each other in terms of TDOFD using ANOVA, there was no significant differences in the early PT group, $F(4, 336) = 0.55, p = .70$, or delayed PT group, $F(4, 105) = 1.44, p = 0.23$. This finding was unanticipated, since the conventional wisdom was that older workers took longer to recovery from injury than young workers. Thus the ≤ 24 age bracket took just as long on average to return to FDW as the > 55 age bracket.

Health care, retail food, and maintenance, repair, cleaning, and installing occupational groups all returned to work sooner with early PT. Health care workers who started PT < 10 days from onset of LBP returned to FDW an average of 24 days sooner, $\mu = 21.73, SD = 13.12, 95\% CI [19.26, 24.20]$ vs. ≥ 10 days $\mu = 46.03, SD = 35.46, 95\% CI [33.34, 58.72], p = < .002$. Retail food workers who started PT < 10 days from onset of LBP returned to FDW an average of 12.5 days sooner, $\mu = 21.63, SD = 18.06, 95\% CI [15.65, 27.61]$ vs. > 10 days $\mu = 34.09, SD = 9.69, 95\% CI [28.36, 39.82], p = < .01$. Maintenance, repair, cleaning, and installing workers who started PT < 10 days from onset of LBP returned to work an average of 11 days sooner, $\mu = 25.26, SD = 19.79, 95\% CI [20.12, 30.40]$ vs. ≥ 10 days $\mu = 36.57, SD = 18.93, 95\% CI [28.47, 44.67], p = < .03$. The health care workers in the early PT group were significantly older, $\mu = 39.09, SD = 11.94, 95\% CI [36.84, 41.34]$ vs. delayed PT, $\mu = 33.29, SD = 11.42, 95\% CI [29.20, 37.38], p = < .03$. There no significant difference in TDOFD in early vs. delayed PT in the laborer and productions groups. Both retail food and maintenance, repair, cleaning, and installing workers there was a highly significant difference in the number of days from onset of LBP until occupational provider initial evaluation between the early and

delayed PT groups, $p < .001$. Using ANOVA, no significant difference was found in mean TDOFD between the occupational groups, $F(6, 437) = 0.67, p = .67$ (Table 8).

Table 8

Early Versus Delayed PT Impact on TDOFD in OIALBPP by Occupation^a

Category	OUPT < 10			OUPT ≥ 10			P
	Mean	SD	95% CI	Mean	SD	95% CI	
Health care		n = 108			n = 30		
TDOFD	21.73	13.12	[19.26, 24.20]	46.03	35.46	[33.34, 58.72]	< .002
AAI	39.09	11.94	[36.84, 41.34]	33.29	11.42	[29.20, 37.38]	< .03
PEFD	20.38	13.22	[17.89, 22.87]	37.60	33.10	[25.76, 49.44]	< .01
Laborer		n = 48			n = 16		
TDOFD	26.67	33.96	[17.06, 36.28]	31.13	15.82	[23.38, 38.88]	0.49
AAI	35.39	11.44	[32.15, 38.63]	44.85	9.66	[40.11, 49.59]	< .005
PEPT	2.25	1.95	[1.70, 2.80]	9.63	4.54	[7.41, 11.85]	< .001
Retail Food		n = 35			n = 11		
TDOFD	21.63	18.06	[15.65, 27.61]	34.09	9.69	[28.36, 39.82]	< .01
PEPT	2.97	3.37	[1.85, 4.09]	7.27	3.19	[5.38, 9.16]	< .002
OUPE	1.60	1.64	[1.06, 2.14]	7.55	4.10	[5.13, 9.97]	< .001
Maint Repair		n = 57			n = 21		
TDOFD	25.26	19.79	[20.12, 30.40]	36.57	18.93	[28.47, 44.67]	< .03
OUPE	2.51	2.37	[1.89, 3.13]	7.43	5.15	[5.23, 9.63]	< .001
Production		n = 59			n = 13		
TDOFD	26.68	28.91	[19.30, 34.06]	24.23	10.66	[18.44, 30.02]	0.62
PEPT	2.53	2.68	[1.85, 3.21]	5.46	3.25	[3.69, 7.23]	< .02

n = number in group, Mean = average number of days, SD = standard deviation, CI = confidence interval, PT = physical therapy, TDOFD = total days off full duty, OIALBPP = occupational isolated acute low back pain patients, OUPT = number of days from onset of LBP until physical therapy initial evaluation, AAI = age in years at date of injury, PEPT = number of days from occupational provider initial evaluation until physical therapy initial evaluation, PEFD = number of days from occupational provider initial evaluation until return to full duty, OUPE = number of days from onset of low back pain until occupational provider initial evaluation.

^aStudent t test not reported on Commercial Drivers, Protective, or Management Teaching occupations due to small sample size.

p = probability as calculated by Student t test.

The evaluation of injury severity in LBP yielded no significant difference in comparing Oswestry Disability Index (ODI) scores < 40 to > 40 in total days off FDW. In addition, no significant differences were noted in ODI scores in early vs. delayed PT in OIALBPPs. Only 8% of OIALBPPs who RTW had ODI scores noted on PT initial evaluation, thus sample size was small.

Discussion

The primary purpose of this quality improvement project was to determine the best time frame to refer OIALBPPs to physical therapy in order to return them to FDW the quickest. OIALBP represents 7.5% (120,000) of days away from work, restricted work duty, or transfer to another job after a work related injury (DARTs) reported annually (BLS, 2014). Total days off full duty (TDOFD) were used as a proxy for DART in this project. Whitifill et al. (2010) concluded early PT significantly improved RTW status. However Whitifill et al. did not define early PT in terms of days from LBP onset to PT intervention, nor was the total length of disability reported within their study. Whitifill et al. study included employees who had LBP of 6 -12 weeks duration prior to PT invention. Fritz et al. (2012) study defined early as PT that occurred within 14 days of patient's primary health care consultation. There is a noted difference in time in their study and the one I conducted. Fritz et al. definition of early PT is 4 days longer, plus an unknown period of time from the onset of LBP until the primary health care consultation (Fritz et. al., 2012).

The > 5 day highly significant delay in presenting to the occupational health provider in the delayed PT group, along with the 8 day delay in starting PT once ordered

in the delayed group point to the deleterious effect these delays have on OIALBPPs RTW (Table 4). As discussed by MacEachen, Kosny, Ferrier, & Chambers (2010), delay in reporting injury to workers compensation, over compliance of the employee in struggling through full duty work while injured, aggressive challenging of work relatedness, and co-workers unwilling to take on extra workload for the injured worker can delay presentation to health provider for initial evaluation & ordering of PT.

Once PT is ordered, the injured employee may delay PT due to the fear of making the injury worse. This reason for delaying PT increases TDOFD. Delayed PT approval from workers compensation carriers and/or third party administrators also results in significant increases in TDOFD.

In this project, the length of PT treatment until RTW was not significantly different between the early and delayed PT groups, $p = .96$. Thus increasing efficiency in employer referring OIALBPP's for health provider evaluation, along with prompt initiation of PT once ordered, is the best way to decrease TDOFD in OIALBPP's.

Implications on Practice

Referring OIALBPPs to early PT (within 14 days of the medical consultation) was found to reduce health care utilizations/visits, advanced imaging, major surgery, lumbar spine injections, opioid medication, and health care cost (Fritz et. al., 2012). The findings from this project could prevent ALBP from progressing to chronic back pain, enable OIALBPPs to live a better quality of life, increase productivity, increase company revenue, and lower insurance costs (van Duijn et. al., 2010, Fritz, et al., 2012, Iles & Wyatt, 2013, Mitchell & Bates, 2011). The data I analyzed showed a 13.5 days reduction

in TDOFD with PT starting < 10 days from LBP onset. An evidence-based time frame was identified, and implemented into the organization's OIALBP standard. The project's findings allow the organization's occupational health care providers to have an operational definition of early PT as well as a evidence-based time frame to refer their OIALBPPs to PT.

Implications for Future Research

This project opens the door for future OIALBP studies and research. The project may be used to examine various other occupational groups and cultures. Future studies and research is needed to close the noted OIALBP gap in the literature.

Implications for Social Change

This informative quality improvement project may be replicated by other occupational health providers, employers, physical therapists, and insurance companies to determine the most ideal time to refer OIALBPPs to early PT in order to return them to FDW as soon as possible. Returning OIALBPPs to FDW aids in reducing health care cost, lost employee income, and may prevent ALBP from progressing to chronic back pain, which allows OIALBPPs to live a better quality of life. Employer benefits may include an increase in productivity, increased company revenue, and lower insurance costs.

Recommendations

Educate employers on the importance of referring OIALBPPs promptly to occupational health to reduce TDOFD. Occupational health care providers should order PT on OIALBPPs on date of initial evaluation. The medical director should implement

this suggestion to the LBP standard, and monitor compliance of the providers. Back injured patients need to be encouraged to schedule PT promptly, and reassured that PT will not worsen their condition. In addition, OIALBPPs, and the involved workers compensation carrier, need to be educated on how starting PT < 10 days from onset reduces TDOFD. The PT providers need to have appointments readily available to accommodate OIALBPPs within the 10 days time frame from LBP onset. In this manner, return to FDW can be expedited in OIALBPPs.

Contribution of the Doctoral Project Team

The quality improvement team consisted of a doctor of nursing practice student who served as the project leader, the director of occupational health care, an occupational physician, and one occupational nurse practitioner. The evaluation guide for this project was the diffusion of innovation model. The project design was a retrospective chart review. All low back injuries from January 1, 2009, ending December 31, 2015, that contained ICD-9-CM codes 724.2 lumbago, 847.2 sprain of lumbar, and 846.0 sprain of lumbosacral were identified from the organization's medical data base, the mechanism of injury reviewed, and the ones with OIALBP abstracted by the occupational health care providers. Upon IRB approval the data was analyzed and calculated by the project leader who was aided by an occupational health care physician.

Project Strengths and Limitations

Strengths

Strengths of this project include a clear definition of early PT, less than 10 days after onset of LBP as reported to workers compensation. A comparison was made of the

length of DARTs between early and delayed PT with an associated highly significant reduction in TDOFD in the early PT group. An analysis of PT's effect was performed on TDOFD between BLS age brackets and occupational groups. This project identifies two occupational groups, retail-food and manage/teach where PT utilization needs to be encouraged. The project data demonstrates that early PT is associated with a decrease incidence of MMI, and permanent work restrictions. The calculations point out that delay in ordering PT and delay in starting PT once ordered is associated with an increase in TDOFD in OIALBPPs. An age group was identified, 45-55 years of age that achieves maximum benefit from early PT with a total of 22.5 days reduction in TDOFD. The project identifies the occupational groups of health care, retail/food, and maintenance repair cleaning installing that have an associated significant reduction in TDOFD with early PT. The data shows that older workers do not have a significantly more prolonged TDOFD compared to younger workers.

Limitations

There were several limitations noted in this project. Only the initial PT date was used. The amount, type, duration, & attendance record of OIALBPP's PT was not evaluated. There was no outcome evaluation of the OIALBPPs who did not undergo PT in this project. The RTW status of patients LTF was unknown. Some age categories and occupational groups with PT initial evaluation > 10 days from onset had small sample sizes. In addition only 8% of injuries had Oswestry disability index recorded, thus sample size for injury severity was small. The project only examined OIALBPPs specific to the project site. This project has identified a strong association between early PT and RTW

sooner. Because of the retrospective nature of this project, early PT causing OIALBPPs to RTW faster cannot be inferred from this data.

Recommendations for Remediation of Limitations

The inclusion of the amount, duration, type, and attendance record of OIALBPP's PT course could better quantify PT's impact on this occupational injury. A multiple institution or more high volume occupational health center study could generate more robust sample sizes in the delayed PT age and occupational categories. A follow up questionnaire to LTF patients may help establish RTW status after OIALBP injury. Having all OIALBPP's complete an Oswestry disability index as part of initial occupational health provider evaluation could improve injury severity evaluation of PT, No PT, and LTF groups. A prospective double-blinded study of early versus delayed PT may better elucidate whether this modality causes OIALBPPs to RTW sooner.

Summary and Conclusions

The project's goal of identifying the most ideal time to refer OIALBPPs to PT was accomplished. In conclusion OIALBPPs who receive PT less than 10 days from the initial pain onset return to FDW nearly two weeks sooner than those who delay PT. Referring OIALBPPs to PT early may lower the economic burden that OIALBP places on the injured employee, their families, employers, health care budgets, and society as a whole.

Section 5: Dissemination Plan

Introduction

The project's findings were accepted by all of the organization's health care providers and implemented into the organization's existing OIALBP standard by the occupational health care medical director. The most ideal time to refer OIALBPPs to PT was identified. The medical director and the other occupational health care providers were encouraged to share and disseminate the project findings to the PT department, employers, worker compensation carriers, and OIALBPPs. An evaluation of the implementation will be monitored quarterly by the organization's medical director. I would like to have this project considered for publication in the Journal of Occupational Nursing, Journal of Occupational and Environmental Medicine, and the Journal of Nursing Research.

Analysis of Self

As a Scholar

The American Association of Colleges of Nursing Task Force Scholarship views nursing scholarship as activities which systematically advance the teaching, research, and practice of nursing through rigorous inquiry that (a) is significant to the profession, (b) is creative, (c) can be documented, (d) can be replicated or elaborated, and (e) can be peer-reviewed through various methods (American Association of Colleges of Nursing Task Force on Defining Standards for Scholarship in Nursing [AACN], 1999). This doctoral of nursing practice project allowed the project leader to focus on a clinical practice problem, and utilize statistical methods to analyze and identify a solution to the problem. The goals

of the project were clearly stated, the procedures were appropriate and well defined. Resources needed to meet the stated goals were adequate. As the project leader, I was able to communicate and collaborate effectively with stakeholders, and the results of the project findings were found to be significant to the project site.

As a Practitioner

The doctor of nursing practice degree increases the nurse practitioner's organizational, economic, and leadership skills (Chism, 2009). As a family nurse practitioner, I believe my organizational leadership, project implementation, development, and quality improvement skills were improved by conducting this doctor of nursing practice project.

As a Project Developer

As the project developer, I found using effectiveness-based program planning aided in producing a clearer understanding of the clinical problem. I was also able to make clear to the stakeholders what was working as well as identify where changes needed to be made. The skills that I acquired from carrying out this project equipped me with the knowledge, tools, and confidence to conduct other evidence-based quality improvement projects.

Future Professional Development

Upon receiving my doctoral of nursing practice degree (DNP), I plan on obtaining a faculty position in a graduate nursing program teaching project planning and development. I plan to become an active member of a clinical research team, and conduct future research and studies in the hope of identifying and addressing other clinical

problems. DNPs possess the knowledge and skills to be the leaders in clinical problem solving.

Summary

The most effective time frame was uncovered to refer OIALBPPs to PT in order to return them to FDW as soon as possible. The findings of this evidence-based project were implemented in the organization's OIALBP standard. This project may be replicated to address the most effective time frame to refer OIALBPPs to PT in other cultures and occupational industries. Identifying the most effective and efficient time frame could have a positive effect on OIALBPPs quality of life, reducing absenteeism, presenteeism, worker's compensation claims, health care cost, health care visits, loss of productivity, and loss of wages. This project narrows the gap in the literature related to occupational isolated acute low back pain.

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Appendix

Institutional Review Broad Approval

Dear Ms. Stephenson,

This email is to notify you that the Institutional Review Board (IRB) confirms that your project entitled, "Return to Full Duty Work: Determining the Ideal Time to Refer Occupational Isolated Acute Low Back Pain Patients to Physical Therapy," meets Walden University's ethical standards. Our records indicate that you will be analyzing data provided to you by [REDACTED] as collected under its oversight. Since this project will serve as a Walden doctoral capstone, the Walden IRB will oversee your capstone data analysis and results reporting. The IRB approval number for this project is 01-11-16-0483271.

Sincerely,

Office of Research Ethics and Compliance

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