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Review Article

Low Back Pain

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Abstract

Based on the findings, there is a significant relationship between static sitting and LBP. The more one sit for over than 90 minutes without body stretching, the higher the chance for the particular individual to experience low back pain. It is also found out that there is no significant difference of LBP considering length of experience. So one can experience LBP with a static sitting for more than 90 minutes even just work recently. And lastly, although there is no difference of LBP among bus drivers considering smoking habit, it still but still it is a risk factor for having LBP together with other lifestyle factors. It is better to prevent than to cure. So it is better to avoid any cigarette to prevent LBP occurrence.

Based on the findings of the study, it is suggested for the administrators to take care of the employees, in this case are the drivers. Let the drivers have some time to rest after sitting statically for more than 90 minutes to lessen the low back pain caused by driving for a trip. It is suggested for all the drivers, although they just started working, as low back pain is not determined by the length of experience of the drivers. And lastly, although the findings suggested that smoking is not associated with LBP, but still it is one of the risk factor for having LBP. For the next researcher, it is also recommended that the working attitude be measured to determine which position of the drivers could cause LBP.

Keywords: Low back pain; article; original

Introduction

Most of the time, work activities such as such as twisting, bending and frequent heavy lifting are regarded as causal factors for many back injuries. One of them is low back pain (LBP). It is a common musculoskeletal disorder, found almost in every occupational category and serves as the leading cause of disability which interferes with an individual's quality of life, social life and work performance [1].

LBP itself is characterized by pain on the twelfth ribs to the lower gluteal folds, posterior to the body that lasts for one day. A study done by Godges, Anger, Zimmerman and Delitto showed that the respondents with LBP were unable to return to work, which eventually affect one's work [2]. According to Manchikanti, Singh, Falco, Benyamin and Hirsch [3], LBP in USA is escalating. Based on literatures reviewed, the prevalence of low back pain is increasing. LBP is rated as the second leading cause of lost working hours which leads to decrease productivity due to lower back pain [1,4,5].

In their book, Brown, Edwards, Seaton and Buckly [6] mentioned that LBP is the most frequent and one of the most common occupational problems in developed countries. It is estimated that 2% to 5% of people in high income countries have chronic LBP. It is also resulted in frequent limited activity in young and middle aged, in which many of its result in permanently debilitated.

Employers are obligated to protect health and safety of the employees. Some health and safety regulations are particularly relevant in dealing with back pain. LBP can be prevented and managed appropriately by addressing contributing factors causing LBP. Days of absent of the workers can also be reduced to maximize productivity at work [1].

According to Manchikanti, Singh, Falco, Benyamin and Hirsch [3], approximately, global prevalence of low back pain affecting adults shown for a one-month prevalence it reached 23%, for one-

year prevalence it reached 38% and for a lifetime prevalence it shown approximately 40%. United States Department of Labor reported that the leading nature of injury account for 37% in 2015 was back pain with the occupations that had the highest number of cases included heavy and tractor-trailer truck drivers, laborers and freight, stock, and material movers, and nursing assistants. It requires the employees to be away from work approximately 10 days because of the injury [2].

In Indonesia, Maulida, Naila, Nusantari and Maghfiroh [7] mentioned that approximately 80% of the population at least have experienced LBP. It was also mentioned by Sianturi, Sinaga and Kalsum [8], the prevalence of LBP in 2011 is higher in male (18.2%) than in female (13.6%) as the Souther Italian Community Oriented Program for Control of Rheumatic Disease reported.

Several risk factors to LBP including lack of muscle tone, excess body weight (obesity), smoking, age, poor posture, pregnancy, lifestyle, family history of back pain and psychological stress. According to Bureau of Labor Statistics [2], one of the most commonly risk factors of LBP are sitting. Static sitting in working for hours and poor working ergonomics cause LBP. It contributes 39.7% – 60% for adult to have low back pain. It causes the muscles and ligaments on the back strained and sprained because of a prolonged sitting [9].

As are 2.775 times tend to experience LBP than those who work under four years. In his study, Koesyanto [10] also found the same result. This is because monotonous work with unnatural work attitudes provides additional workload and ultimately leads to LBP.

Based on interviewed, drivers in X company spent two to three hours of driving bus from one destination to another destination without resting. Many drivers complained of low back pain that lasts for a day. It subsided when the drivers were done with their work and had the chance to rest. And what makes it worse, sometimes they had to be admitted in the hospital because of the pain, in which it disturbed them while driving. Thus, through this study, the researcher hopes to identify how prolonged sitting affect the low back pain of the drivers in X company.

This study aimed to determine whether prolonged sitting causes low back pain among drivers in X company. Specifically, this study sought to answer the following questions:

• Is there a significant relationship between static sitting and low back pain among bus drivers?

• Is there a significant difference of low back pain among bus drivers considering length of experience?

• Is there a significant difference of low back pain among bus drivers considering smoking habit?

Low Back Pain

According to the World Health Organization's International Classification of Impairments, Disabilities and Handicaps, LBP is a condition revealing abnormality of the lumbar spine structure. As cited by Junior, Goldenfum and Siena [11], it is a deficiency and causes a disability which limits or prevents full performance of physical activities. The evidence of LBP may be caused by abnormal stress or even overused, and can be related to muscle imbalances, compressive or postural syndromes, muscle weakness, increased tiredness or trunk instability, reductions in amplitude or coordination of movements, stress and obesity. And one of the most commonly cited risk factors of occupational related LBP is sitting [12,13].

As cited by Junior, Goldenfum & Siena [11], acute LBP generally is related to damage to muscle and/or intervertebral discs and ligaments. The International Association for the Study of Pain classified LBP as subacute, acute and chronic. Pain felt in subacute phase is lasted for five to seven weeks but not more than 12 weeks. For acute phase, it is usually a self-limiting case, characterized by sudden onset of pain that lasts at least for 12 weeks. Usually, most acute LBP is caused by trauma or several type of activity that causes undue stress such as hyperflexion of the lower back. Some activities that causes stress on the lower back are heavy lifting, overuse of the back muscle when doing manual labor, and sports injury. Chronic LBP lasted more than 12 weeks and affect productivity. Acute pain or chronic pain at the back involves the lumbar area including lumbosacral or sacroiliac areas of the back, due to strains in the muscles and tendons [6,12,15].

Clinical Manifestation

According to LeMone et al [12] and Smeltzer, Bare, Hinkle, & Cheever [13], people with LBP suffer from mild pain that lasted for a few hours to chronic debilitating pain. Other manifestations include alterations in gait and flexion such as stiff and flexed walking, unable to bend at waist, limp due to impairment of the sciatic nerve; neurological involvement such as loss of bowel and bladder control due to sacral nerve involvement, when tested on both limbs for sensation, the unaffected side may feel stronger sensation; and continuous, knife-like pain sensed on the affected leg when walking on heel or toes, pain in muscles close to the affected disc, pain in the middle buttock, and sharp burning pain in the posterior thigh or calf.

A study in Brazil shown that 76.7% of people with chronic LBP experienced sufficient intensity pain which compromise their work. LBP is also a major cause of work absenteeism and accounts for a high proportion of Occupational disability costs

Diagnostic test

Several definitive diagnostic abnormalities are present with muscle strength and nerve irritation. A straight-leg raise is one of the tests for LBP. This test is positive for disc herniation when radicular pain occurs. Generally, MRI and CT scan are not done unless there is trauma or systemic disease [6].

Medication

Occupational Safety & Health Administration (OSHA) mentioned that in order to assist the employees to achieve a safe and healthy work environment, the employers and the occupational health care physicians work collaboratively to reduce/prevent hazardous situations to implement workplace health and safety. The choice of medication for LBP includes NSAIDs and analgesics. To relieve pain, NSAIDs function to block prostaglandin production and reduce inflammation. Other medications such as systemic corticosteroids, NSAIDS, tricyclic antidepressants, skeletal muscle relaxants, opiod analgesics, and antianxiety drugs all had little evidence of effectiveness for LBP [2,12,13].

Management

Other conservative treatment for LBP include limited rest, together with education and appropriate exercise. No evidence shown that activity may aggravate LBP, provided that the client increases activity gradually along with recovery. In fact, it may increase endorphine levels and promotes bone and muscle strength. Therefore, active rehabilitation is advised to resture function and reduce pain. Physical therapy procedure that can be applied to reduce muscle spasms and pain temporarily are ultrasonography, hydrotherapy, diathermy (deep heat therapy) and transcutaneous electrical nerve stimulation (TENS) unit. Ice bag or hot water bottle or heating pad may also relieve pain by applying it on the back [12,15].

The focus of nursing care on person with LBP is to relieve pain and education is another essential aspect of treating LBP. According to National Institute of Neurological Disorders and Stroke [16], there are recommendations made as part of health recommendation such as exercise regularly to maintain and build muscle strength, stretch before doing activity, maintain a correct posture, use supportive seat when driving, reduce emotional stress that cause muscle tension, lose weight if needed, quit smoking and lift by bending the knees.

According to National Institute of Neurological Disorders and Stroke [16], the client needs to be educated about the good posture and body mechanics to avoid recurrence of LBP such as on how to sit, stand, lie and lift properly. It is advised for the client to look into the mirror to see whether the chest is up, abdomen is tucked in, and the shoulders are down and relaxed. In sitting position, the knees should be at the same level as the hips or higher to avoid lordosis. The hips and knees should be flexed. The back should be supported with feet flat on the floor. When lie down, the client needs to sleep on the side with knees and hips flexed or in supine position, the knees are supported in a flexed position. Sleeping prone should be avoided [13].

Static sitting

Back pain is caused by various work factors. One of them is poor/awkward posture such as bending over, stooping, or crouching. When the same position is maintained for a long period of time, back pain is more likely to occur. According to Janwantanakul, Pensri, Moolkay and Jiamjarasrangsi [17], continuous sitting and frequently working in forward bent position, and particularly, poor workstation ergonomics, is significantly contribute to the development of LBP.

Many biomechanical studies have been performed to determine the effects of the low back in sitting. Another finding reported is that to compare to standing position, when in sitting position, lumbar lordosis is decreased, and low back muscle activity, disc pressure and pressure on ischium is increased. It is associated with LBP [18]. The ligaments of the spine are abundantly supplied with pain receptors which are vulnerable to traumatic tears (sprains) and strains and fracture. So the longer a person sit, especially when the body is flexed in sitting, the muscle and the ligament become more tense, especially the longitudinal ligament posterior at the lumbar vertebrae. It then causes injury to the muscle and causes lower back pain [19].

As cited by Samara, Basuki and Jannis [9] people who work in a sitting position for half day of work or more is at risk of having LBP. Drivers are one of the jobs that have this risk of LBP because most of the working hours are spent by sitting. They further recommended not to sit for more than 1, 5 hours in working and if the job requires sitting for more than those hours, do some body relaxation between those working hours.

In their study, Samara, Basuki and Jannis [9] found out that static sitting for 91-300 minutes are 2.35 times greater risk of LBP compared to static sitting for 5-90 minutes. To avoid excess stresses on the back, it is necessary to modify workspace or machinery for workers [16].

Moderator Variables

Length of Experience: According to Hendra and Suwardi [20], those who work more than four years are 2.775 times tend to experience LBP than those who work under four years. In his study, Koesyanto [10] also found the same result. This is because monotonous work with unnatural work attitudes provide additional workload to the back. The level of muscle endurance as it is used for work decreases with the length of time as a person works. The longer the work, the higher the risk for subjective complaints on

the back and ultimately lead to LBP. Meanwhile, according to Sianturi, Sinaga and Kalsum [8], drivers who work more than 14 years' experience more low back pain than drivers who work less than 14 years

Smoking Habit: According to Shiri, Karppinen, Leino-Arjas, Solovieva and Viikari-Juntura [21], smoking is taught to be one of the contributing factors causing LBP. Studies have shown that to compare with non-smokers, smokers have a greater risk of developing back pain due to the effects of nicotine on constriction of the arteries. It causes reduced oxygen supply to the spinal discs and decreased blood oxygen which result in back pain. Also mentioned by Samara, Basuki and Jannis [9] and Woolston [22], smoking can cause vasoconstriction to the blood vessel and damage the soft tissue in the body and in the lower back. It slows down the circulation and also the nutrients' flow to different muscles and joints inside the body thus causes LBP. In their study, Sianturi, Sinaga and Kalsum [8], found out that those who smoke experience low back pain and those who did not smoke did not experience any low back pain during working.

Methodology

This chapter presents the research design, population and sampling techniques, instrumentation and the treatment of the data. The procedure that was used in the data gathering is likewise included.

Research design

This study is a correlational type of research to determine whether static sitting causes LBP among bus drivers. This approach is believed to be appropriate since a correlational design as mentioned by Plichta and Garzon [23] allows the researcher to search, examine and determine whether there is an association that exists between variables. Meanwhile, correlational study is a test for statistical relationship between variables. It begins with the idea that such relationship between the variables might exist. Since then, the researcher measures both variables and sees whether they are related to each other or not [24].

Population and sampling technique

The population of this study is composed of 58 bus drivers working in the same trip destination in X company. The researcher used convenient sampling method in choosing the respondents. The questionnaires were given at the end of the day after the drivers work.

Instrumentation

To gather data from the respondents, the researcher constructed and adopted the questionnaires based on literatures and previous studies. The first part of the questionnaire is self-constructed. It is composed of demographic profile of the respondents which included the age, length of experience, smoking habit and the length of sitting when working. The second part of the questionnaire measured the low back pain of the bus drivers, adopted from Burton and Ludwing [25] by the use of numerical pain scale from 0 to 10. The way the pain scale is interpreted is score 0 for no pain, score one to three for minor pain, score four to six for moderate pain, score seven to ten for severe pain.

Statistical treatment of Data

The data was analyzed with Statistical Package for the Social Sciences (SPSS). Correlational analysis of Pearson Product Moment Coefficient Correlation will be used to answer the research question number one. Comparative analysis of One-Way ANOVA will be used to answer research question number two and three.

Results and Discussion

This chapter presents the discussion, findings and interpretation of the data gathered. The data retrieved were statistically analyzed to answer the sequence of the research questions.

Demographic Profile of the respondents

This section presents the demographic profile of respondents. Textual and table presentations of the average static sitting, average low back pain, average length of experience and average smoking habit of the respondents are presented accordingly. (Table 1-6)

Descriptive Statistics					
N	Min	Max	Mean	Std.	Dev.
LBP	58	0	7	4.62	2.042
Valid N (list wise) 58					

Table 1: Descriptive Results of Average Static Sitting.

Descriptive Statistics					
N	Min	Max	Mean	Std.	Dev.
LEx	61	1	27	3	3.583
Valid N (list wise) 61					

Table 2: Descriptive Results of Average Low Back Pain.

Descriptive Statistics					
N	Min	Max	Mean	Std.	Dev.
SH	61	0	30	10.79	9.728
Valid N (list wise) 61					

Table 3: Descriptive Results of Average Length of Experience.

Low Back Pain	
Variable r	Sig VI
Static Sitting 0.283	0.031 Significant

Table 4: Descriptive Results of Average Smoking Habit.

DF	Mean	F	Sig.
Between Groups 2	6.888	1.692	0.194
Within Groups 55	4.071		
Total 57			

Table 5: Relationship of Static Sitting and Low Back Pain.

DF	Mean	F	Sig.
Between Groups 3	6.218	1.5333	0.216
Within Groups 54	4.056		
Total 57			

Table 6: Difference of Low Back Pain among Bus Drivers Considering Smoking Habit.

Average Static Sitting

The average static sitting among 58 drivers is 120.16. It indicates that for a trip, majority of the drivers spent 120 minutes driving in a static position, without even have to rest for some stretching.

Average Low Back Pain

The average low back pain among the drivers is 4.62. This is interpreted that majority of the drivers have a moderate pain. When assessed further by confirming the administrator, if the drivers intolerate pain, they would not be assigned as drivers as the job has a high safety precautions.

Average length of Experience

Most of the drivers have an average length of experience of 3 years, with the range of minimum experience of 1 year and the maximum year of 27 years, working as a driver.

Average smoking habit

The drivers smoking habit per day is 10 cigarettes. The range of minimum cigarette smoked per day is from 0 to 30 cigarette.

Relationship between static sitting and low back pain

When assessing the relationship between statis sitting and low back pain, it is shown p value = .031. This indicates that there is a relationship between static sitting and low back pain. Although the correlation is not that strong (r = 0.283), it is shown a positive correlation which means the more the drivers sit, it is likely for the drivers to get low back pain.

As cited by Samara, Basuki and Jannis [9] people who work in a sitting position for half day of work or more is at risk of having LBP. Drivers are one of the jobs that have this risk of LBP because most of the working hours is spent by sitting. When the same position is maintained for a long period of time, back pain is more likely to occur. Another finding reported is that to compare to standing position, when in sitting position, lumbar lordosis is decreased, and low back muscle activity, disc pressure and pressure on ischium is increased. It is associated with LBP [18].

Difference of low back pain among bus drivers considering length of experience

When analysing the difference of low back pain among bus drivers considering length of experience, it is found out the p value = .194. The finding of the study suggests that regardless of the length of experience as a driver, the level of low back pain of the respondents is still the same. Those who work for a year has the same level of back pain as those who work for more than four years. This is contrary to the study by Hendra and Suwardi [20]. According to them, those who work more than four years are 2.775 times tend to experience LBP than those who work under four years. In his study, Koesyanto [10] also found the same result. This is because monotonous work with unnatural work attitudes provides additional workload to the back. The level of muscle endurance as it is used for work decreases with the length of time as a person works. The longer the work, the higher the risk for subjective complaints on the back and ultimately lead to LBP.

The finding could be attributed to the fact that after a trip that lasts mostly within 120 minutes, the drivers have the chance to have some period of rest before continuing another trip. This gives the drivers another chance for some muscle stretching from a monotonous work, thus prevention for LBP.

Difference of low back pain among bus drivers considering smoking habit

When analysing the difference of low back pain among bus drivers considering smoking habit, it is found out the p value = .216. The finding of the study suggests that regardless of the smoking habit, the level of low back pain of the respondents is still the same.

According to Al-Obaidi, Anthony, Al-Shuwai and Dean [26-28], there is no direct association between cigarette smoking and low back pain. Low back pain is likely associated with other unfavourable lifestyle habits such as sedentary lifestyle, physical inactivity, being overweight and alcohol consumption. Based on the findings, although there is no difference of low back pain considering smoking habit, but still it is a risk factor for having LBP together with other lifestyle factors.

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