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WORK RELATED PSYCHOLOGICAL FACTORS AND THEIR EFFECT ON LOWER BACK PAIN AMONG PROFESSIONAL BUS DRIVERS

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ABSTRACT

Literature on the effects of psychological risk factors on the prevalence of LBP shows that work related stress, job dissatisfaction, lack of job support, tension, anxiety, depression, anger, hostility from colleagues and passengers can lead to a higher LBP prevalence. The high prevalence of LBP, frequent exacerbations, impaired spinal functions lead to increased disability rates. This leads to considerable economic loss to the individual as well as the community. The current study followed an analytical cross sectional study design. Data was collected through an interviewer administered questionnaire from 140 participants. Out of a sample of 140 participants 5% (n=7) were feeling stressed at work, 5.7% (n=8) felt dissatisfied at work. 12 participants, (8.6%) found their work monotonous, 10 (7.2%) felt time pressure at work, 5.8% (n=8) felt no support from co-workers, 4.3% (n=6) felt that they were unable to cope with the demands from work. The study found a statistically significant relationship between the presence of LBP with feeling stressed at work ($p=0.000$) and feeling dissatisfied with work ($p=0.042$). The study found no statistically significant relationship between the presence of LBP and finding work monotonous ($p=0.82$) among professional bus drivers. These study findings will help to identify the prevalence of LBP in a high risk occupational group and the psychological risk factors related. The findings will in turn be helpful in

introducing preventive measures to reduce the incidence of LBP.

Key words: Work related psychological factors, Lower back pain, Professional drivers

INTRODUCTION

Lower back pain is one of the commonest causes of morbidity and has a significant social, economical and health impact on the individuals affected. Available data suggests that the prevalence of LBP is increasing, leading into more functional limitations and reduced productivity.

Lower back pain has been identified as one of the disorders having the highest economic impact among the working population across the world. Studies show that professional drivers are at an increased risk for low back pain and injury due to a range of reasons including whole body vibration, shocks and jolts, prolonged sitting, and postural factors.

World Health organization (WHO) states LBP as a “condition revealing loss or abnormality of the structure of the lumbar spine with psychological, physiological or anatomic etiology or as a deficiency that causes a disability limiting or preventing full performance of physical activities (WHO, 1980). LBP is one of the commonest causes for absenteeism, hospitalizations, medical consultations and surgical interventions among the working population (Ganesan et al., 2017, Ramadas & Jella., 2018) and is one of the

commonest health issues faced by adult populations all around the world. Studies have found that more than 50% of adults have experienced LBP at least once in their life time (Hoy et al., 2003). Majority of these issues resolve within a short period of time, however some cases leads to limited range of activities among adults (Yun Li & Huang., 2012).

The high prevalence of LBP, frequent exacerbations, impaired spinal functions lead to increased disability rate (Bagirova & Ignatcheva 2001). This leads to considerable economic loss to the individual as well as the community. Exposure to professional driving is associated with increased absence from work due to LBP (Porter, & Gyi 2002). With all these adverse effects LBP leads to restrictions social and professional life. LBP is the main cause of absenteeism among drivers. The drivers' sick leave days and hospital admitted days were less even though they complained of higher intensity of LBP, indicating that they get less recovery time and higher chance of relapse. (Jadhav, 2016).

There is an increasing understanding that psychological factors play an important role in occupational related injuries, especially work related back pain. They may be work related or personal life related psychological factors, but they have been found to have a profound effect on onset of lower back pain and its transition from acute to chronic.

Studies have found that psychological factors were related to the onset of pain, acute, subacute and chronic pain and pain behavior. Psychological factors have been found to play an important role in treatment failure in LBP and in making acute pain chronic (Shelerud, 2006). Self-perceived job stress, job dissatisfaction and lack of job support showed a marginal relation to prevalence of LBP (Bovenzi, et al., 2006).

Available literature on the effects of psychological risk factors on the

prevalence of LBP shows that work related stress, job dissatisfaction and lack of job support, tension, anxiety, depression, anger, hostility from colleagues and passengers can lead to a higher LBP prevalence. (Tamrin et al., 2007; Najenson et al., 2010; Bovenzi et al., 2006). Previous studies have also identified that public transport drivers are highly stressed during their daily driving course due to various working conditions (Gangopadhyay, & Dev, 2012).

Sri Lanka as a developing country uses the public transportation system as its key transportation method, in which long distance bus rides play a main role. The country has a large number of professional bus drivers and Sri Lankan studies are scarce on the prevalence of lower back symptoms in them. The findings of this study will be beneficial in identifying the social and economic impact of occupation related lower back pain and take necessary steps to prevent and minimize them.

LITERATURE REVIEW

Lower back pain and other lower back symptoms in Professional Drivers

Back pain in working individuals is a common presenting complaint in primary health care settings. Back pain is classified as occupational back pain is when it occurs as a consequence of the individual's occupational activity. Occupational low back pain is the largest single health problem related to work and absenteeism. It's commonly seen among workers aged less than 45 yeras and is responsible for approximately one quarter of all cases of early occupational invalidity (Marras, 2000). Occupational lower back pain is related to work incapacity, reduced productivity, and absenteeism and increased insurance payments. Since it affects the economy of the active part of the population and the country's economy and it should not only be analyzed as a

medical issue, but also as a social and economic problem.

Self-reported lower back symptoms have been found to be very common among drivers than in non-drivers by several studies carried out in different parts of the world (Bovenzi & Zadini, 1992; Rehn et al, 2002; Bovenzi & Betta, 1994; Robb & Mansfield, 2007; Mozafari, et al 2015; Miyamoto et al, 2000; Nazerian et al, 2020; Boshuizen, et al 1990; Bovenzi, et al 2006). Also these studies have found that LBP and other lower back symptoms are more prevalent in drivers than in non-drivers (Bovenzi & Zadini, 1992; Mozafari et al 2015). These symptoms are mostly common and repetitive in lot of studies. They included leg pain, acute lower back pain, lower back pain (Bovenzi & Zadini, 1992), LBP, sciatic pain, tenderness to touch in the back, acute LBP, transient and chronic LBP, ache pain or stiffness in the back (Bovenzi & Betta, 1994), ache, pain or discomfort in the lower back (Robb & Mansfield, 2007). Back deformities, restricted spinal movements, pain in spinal movements, spinal muscle weakness, step off deformity in the back, para-spinal muscle stiffness, tenderness of the paravertebral muscles, tenderness of the spinal processes, tenderness of sacroiliac joints were found in professional drivers in a study conducted by Miyamoto et al (2000). Out of these musculoskeletal symptoms found through studies, LBP seems to be more prominent (Bovenzi & Zadini, 1992; Rehn et al, 2002; Bovenzi & Betta, 1994; Robb & Mansfield, 2007; Mozafari, et al 2015; Miyamoto et al, 2000; Nazerian et al, 2020; Boshuizen, et al 1990; Bovenzi, et al 2006). accompanied by lower back stiffness and tenderness (Robb & Mansfield, 2007; Miyamoto et al, 2000) among drivers.

Psychological factors related to LBP

Psychosocial factors are also important cause for the development of low back

pain among professional drivers and can limit the quality of their social and professional lives (Kresal et al., 2017).

World Health Organization (WHO) defines a psychosocial factor as any factor determining the way people deal with the demands and challenges of everyday life, maintain a state of mental well-being and behave while interacting with others, their culture and environment (Ramond et al., 2011).

Studies have found that dissatisfaction with work, shift work and unsuitable working conditions significantly affect the incidence of low back pain (Suklan, 2017) as well as self-perceived job stress, job dissatisfaction and lack of job support showed a marginal relation to prevalence of LBP (Bovenzi, et al., 2006). Tension, anxiety, depression, anger, hostility from colleagues (Tamrin, et al., 2007). limited rest during work, traffic congestion on route, lack of accessibility to bus stops, passenger hostility (Najenson, et al., 2010) and supervisor ratings (Skovron, 1992) contributed towards a high prevalence of LBP. Work loss from LBP was considerably influenced by perceived job stress (Magnusson et al., 1996). During the course of their daily drive majority of the bus drivers are highly stressed due to hazardous working conditions and it affect their health and overall work performance (Gangopadhyay & Dev, 2012). Studies have found that job satisfaction, monotonous tasks, work relations, demands, stress, and perceived ability to work were related to future back pain problems (Linton, 2001)

Further studies have found that resilience or the ability to adapt as a response to stressful events as a positive psychological factor to predict positive health outcomes (Hemington, et al., 2017). Reward at work, perceived social support, perceived effort vs rewards in work have also identified as protective factors producing positive outcomes in chronic

back pain rehabilitation (Wippert et al., 2017).

Psychological factors were related to the onset of pain, acute, subacute and chronic pain and pain behavior (Linton, 2001). Psychological factors have been found to play an important role in treatment failure in LBP and in making acute pain chronic (Shelerud, 2006).

Studies have also found that these psychological factors, disrespectful attitude of managers, unsuitable working conditions, personal dissatisfaction and lack of understanding of the partner or spouse influences absenteeism due to lower back pain (Suklan, 2017).

CONCLUSION

Professional drivers are at a higher risk for occupational lower back pain during the course of their professional career. Work related and personal life related psychological factors influence incidence, onset, severity and prognosis of LPB. This study focused on determining the association between LBP and work related psychological factors among professional bus drivers in Western Province, Sri Lanka. The findings will in turn be helpful in introducing preventive measures thus reducing the direct and indirect cost related to LPB in professional bus drivers.

METHODOLOGY

This study followed a descriptive cross sectional study design, with the participation of 140 professional bus drivers. There were around 1500 employees in the selected study population. A sample size of 200 was calculated with 95% confidence interval and 5% margin of error.

Kesbewa and Maharagama central bus dispensaries and the National Transport Medical Institute, Nugegoda were used as the study setting. Data was collected from

140 participants, selected using convenient sampling. All the bus drivers were informed of the study and data was collected from all the bus drivers who were willing to participate and met the inclusion criteria. The inclusion criteria were participants who have more than one-year experience as a professional bus driver, and drivers who did not have acute or chronic back injury, back surgery or history of traumatic accidents.

Data was collected through two interviewer administered questionnaires. One questionnaire collected participants' socio-demographic data on their age, marital status, education level, medical history (hypertension, diabetes, heart disease, asthma). The other collected data on presence of lower back pain, its duration and other symptoms, data regarding stress at work, feeling dissatisfied and monotonous work, feeling pressured for time, unsupported and inability to cope with work was collected from the study population. The questionnaires were designed based on validated questioners of the topic and the findings of previous studies on similar topics. The questionnaires were designed in English and were translated to Sinhala and back translated to increase their validity. The questionnaires were finalized after expert feedback.

The collected data was analyzed using SPSS version 21. Descriptive analytical methods, and chi square were used to analyze the data.

RESULTS

Age, marital status and education level of the participants of the Sample

This study focused on identifying the prevalence of lower back pain (LBP) among professional bus drivers. The sample included 140 male bus drivers between the ages of 23 and 58 years. The mean and standard deviation of the age of

the participants was 39 ± 7.85 years. Majority of the participants (51.4%) were between the ages of 36-45 years.

Table 1: Age distribution of the participants

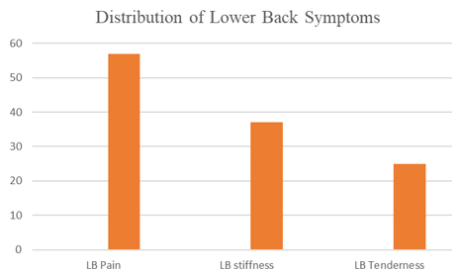
Age groups (years.)	Frequency	(%)
20-25	6	4.3
26-35	38	27.2
36-45	72	51.4
46-55	17	12.1
>55	7	5.0
Total	140	100

The majority in the study population were married (n= 120, 85.7%) and had completed the GCE.O/L examination (n=97,69.3%).

Prevalence of LBP among Professional Drivers

Out of the total study population (n=140), 40.7% (n=57) complained of lower back pain, 27.1% (n=38) suffered from lower back stiffness and 17.9% (n=25) had lower back tenderness during the past 12 months.

Figure 1: Distribution of Lower Back Symptoms



Out of the 40.7% (n=57) of the study population who suffered from lower back pain, 64.9% (n=37) had pain episodes lasting less than 30 minutes, 14% (n=8) had pain lasting between 30-90 minute and a significant 21% (n=12) had pain lasting for more 120 minutes.

Out of the study population who suffered from LBP, 36.8% (n=21) suffered from acute LBP with pain for less than 6 weeks, 17.5% (n=10) had sub-acute LBP having pain for 6-12 weeks, 45.6% (n=26) suffered from chronic LBP with pain for longer than 12 weeks.

Psychological factors related to Lower Back Pain

Out of a sample of 140 participants 33.6% (n=47) reported feeling stressed at work, 26.4% (n=37) felt dissatisfied with work, 25% (n= 35) reported feeling time pressured at work and 18.6% (n=26) felt a lack of support from co-workers. 26 participants (18.6%) felt that they were unable to cope with the demands from work and 36 participants (25.7%) found their work to be monotonous.

Table

2: Psychological factors in professional drivers

	Feel Stressed at work	Feel dissatisfied with work	Find work monotonous	Feel time pressure at work	Feel no support from co-workers	Feeling Unable to cope with work demands
Not applicable	93 (66.4%)	103 (73.6%)	104 (74.3%)	105 (75%)	114 (81.4%)	114 (81.4%)
Apply to some degree, some of the time	40 (28.6%)	29 (20.7%)	24 (17.1%)	25 (17.9%)	18 (12.9%)	20 (14.3%)
Apply to a considerable degree, good part of the time	4 (2.9%)	6 (4.3%)	8 (5.7%)	6 (4.3%)	4 (2.9%)	4 (2.9%)
Apply very much, most of the time	3 (2.1%)	2 (1.4%)	4 (2.9%)	4 (2.9%)	4 (2.9%)	2 (1.4%)

The study found a statistically significant relationship between the presence of LBP with feeling stressed at work ($p=0.000$) and feeling dissatisfied with work ($p=0.042$). The study found no statistically significant relationship between the presence of LBP and finding work monotonous ($p=0.82$), feeling time pressure at work ($p=0.311$), feeling no support from co-workers ($p=0.146$) or feeling inability to cope with work ($p=0.65$), among professional bus drivers.

DISCUSSION

Current literature provides a comprehensive insight on the influence of psychological factors on lower back pain among professional drivers.

This study found a 40.71% ($n=57$) prevalence of LBP among the bus drivers. These findings are in line with existing

literature which has found that drivers are more susceptible to postural pain in any part of spine, furthermore professional drivers are at a higher risk for developing LBP. (Najenson et al., 2010; Chen et al., 2005; Tamrin et al., 2007). A study conducted in India shows a 70.8% of LBP prevalence among public transport bus drivers, compared to the 51.6% prevalence of non-drivers (Jadhav, 2016). The prevalence identified in this study is lower than the prevalence found in several international studies, however, it's in line with a previous Sri Lankan study which found different occupational groups can have different LBP prevalence ranging from 12-30% depending on their profession (Warnakulasuriya et al, 2012).

Studies have found that psychosocial work environment can affect how pain is perceived and how it's coped with (Linton, 2001). This can affect the prognosis of the lower back pain, its severity and the

recovery time. Previous studies have found a range of psychological factors that may affect or lead to lower back pain among professional drivers.

Studies have also found that self-perceived job stress (Bovenzi et al., 2006; Linton, 2001; Tamar, et al., 2010; Magnusson et al., 1996.), tension, anxiety and anger can lead to high prevalence of LBP (Tamrin et al., 2007). Tamir et al., (2010) have found a strong connection between psychological stress and chronic lower back pain. They have found that high levels of psychological stress contribute to turning acute lower back pain into chronic. Current study also found similar results and a similar relationship between stress and work related lower back pain. Out of a sample of 140 participants 33.6% (n=47) were feeling stressed at work and there was a statistically significant relationship between the presence of LBP with feeling stressed at work ($p=0.000$). During the course of their daily drive majority of the bus drivers are highly stressed due to hazardous working conditions and this affect their health and overall work performance. Gangopadhyay & Dev (2012) discusses the possibility that perceived stress is a predictor of future back pain problems. Professional bus drivers face a considerable amount of stress throughout their careers due to limited rest during work, traffic congestion on route, lack of accessibility to bus stop, passenger hostility and supervisor ratings. Hence identifying the stressors these drivers face and addressing them is an important step in tackling their current back pain related issues and preventing further complications and future incidences.

Current study found a statistically significant relationship between the presence of LBP with feeling dissatisfied with work ($p=0.042$) and out of the sample of 140, 26.4% (n=37) felt dissatisfied with work. Previous studies and available

literature reveals similar findings. Job satisfaction has a link with the presence of back pain Gangopadhyay & Dev, 2012). Job dissatisfaction has a positive relationship with the presence of lower back pain (Bovenzi et al., 2006; Bergenudd & Nilsson, 2008; Suklan, 2017). Low job satisfaction has been identified as a risk factor for back pain (Hoogendoorn et al., 2000) and Linton (2001) has linked low job satisfaction to future back issues. Lack of job satisfaction can be linked to low pay, long working hours, lack of appreciation from supervisors and poor coping skills. Identifying and addressing the reasons for the lack of job satisfaction is important in addressing lower back pain and reducing consequent medical expenses and medical related absenteeism.

The studies have also investigated the possibility of perceived higher occupational demand predicting the possibility or presence of LBP. They have found weak or insufficient evidence for perceived work demand leading to or predicting LBP (Hoogendoorn, et al., 2000; Linton, 2001). The current study also explored the relationship of perceived high work demand and the presence of LBP and found negative results on the subject. Only 18.6% (n=26) felt that they were unable to cope with the demands of work and no statistically significant relationship was found between the presence of LBP and feeling inability to cope with work ($p=0.65$), among professional bus drivers. This finding is interesting because even though the higher physical demand in the form of long working hours and longer periods of sitting without changing posture are established risk factors for LBP, perceived high demand at work exhibited no effect on LBP.

Studies have found a link between back pain and whether the work is stimulating or monotonous. There is evidence to suggest that unstimulating or monotonous

work is associated with the presence of lower back pain (Linton, 2001; Gangopadhyay, & Dev, 2012). Current study found 25% (n=36) of the participants felt their work was monotonous and not stimulating. However, current study found no statistically significant relationship between the presence of LBP and finding work monotonous (p=0.82) among professional bus drivers. This might be due to the fact that considerable number of participating drivers (45%) drove shorter distances of 10-59 km as their regular driving route and had more frequent resting times.

Studies have found that lack of support from co-workers can be a predictor for occupational low back pain and disability (Meloche et al., 2004). Linton (2001), Clays (2007) & Hoogendoorn et al., (2000) have found strong evidence that lack of social support at work is a risk factor for LBP and can be a predictor for future back issues (Bovenzi et al., 2006). However, the current study found no statistically significant relationship between the presence of LBP and feeling no support from co-workers (p=0.146). Out of 140 participants, only 26 (18.6%) felt lack of support from co-workers. This may be due to the fact that the participants mostly drive their route alone and doesn't have noteworthy interactions with other drivers during their driving route. So, even though available literature has identified lack of support from co-workers as a risk factor and predictor for lower back issues this might not be applicable to professional drivers since they mostly work in solitary.

The current study also looked at the possibility of a relationship between feeling time pressured at work and the presence of LBP. The study found no statistically significant association between the presence of LBP and feeling time pressure at work (p=0.311). 25% (n=35) of the participants reported feeling

time pressured at work but studies that investigated its effect on LBP was not common. Further more conclusive researches should be carried out to identify the effect of time pressure on LBP.

SUGGESTIONS AND RECOMMENDATIONS

Studies have identified an improving working conditions can reduce the incidence of LBP to some extent (Miyamoto, et al., 2000). Prevention of work-related stress, organizational changes to reduce stress, improving seat comfort and encouraging regular exercise and sports activity have been identified as preventive strategies of lower back pain in professional drivers. (Najenson, et al., 2010). Bus drivers should be covered by especially designed preventive programs, turning attention to health promotion at and outside of work.

Based on the study findings and based on previous literature, this study would recommend, providing regular psychological support to bus drivers in order for them to be able to cope with their daily stressors. Making organizational level changes to their driving routes, working hours and payments and rewards can also be recommended. Encouraging regular exercises programs and sports activities and increasing their awareness on better posture and better back discipline could assist them in managing their pain and lead pain free lives.

CONCLUSION

This study focused on identifying the psychological factors that affect the professional bus drivers and the effect these factors have on the presence of LBP of the drivers. This study will help identify the prevalence of LBP in a high risk occupational group and the psychological risk factors related. The findings will in

turn be helpful in introducing preventive measures to reduce the incidence of LBP.

The study found that there are few risk factors including work related stress that have an effect on LBP. Previous studies have found that the psychological factors can influence the severity, prognosis and recovery of LBP as well as acting as predictors of future LBP issues.

Findings of this study can help identify the professionals who are facing these psychological factors and are more at risk of developing physical symptoms. Identifying and addressing the psychological issues will help lower the number of LBP incidences, reducing the financial burden of medical costs and increasing performance.

Further studies are needed to identify additional psychological factors that lead to LPB and other physical issues. The low sample size and the sampling method can be considered as limitations of the current study and further studies can be planned addressing these limitations. Proper psychological support should be offered to address the identified psychological factors. This will significantly increase the performance and productivity of the employees.

REFERENCES

- Bagirova, G.G & Ignatcheva, N.V (2001) *Prevalence and risk factors of the lower back syndrome in automobile drivers*, *Terapevticheskii Arkhiv*, 73(1), pp.30-33
- Bergenudd, H & Nilsson, B (2008) *Back pain in middle age; occupational workload and psychologic factors: an epidemiologic survey*, *Spine*, 13(1), pp.58-60
- Bovenzi, M & Betta, A, (1994) *Low-back disorders in agricultural tractor drivers exposed to whole-body vibration and postural stress*, *Applied ergonomics*, 25(4), pp. 231-241
- Bovenzi, M., Riu, F. & Negro, C. (2006) *An epidemiological study of LBP in professional drivers*, *Journal of sound and vibration*, 298(3), pp.514-539
- Bovenzi, M. & Zadini, A (1992), *Self-reported low back symptoms in urban bus drivers exposed to whole body vibration*, *Spine*, 17(9), pp.1048-1059
- Clays, E., De Bacquer, D., Leynen, F., Kornitzer, M., Kittel, F. & De Backer, G. (2007) *The impact of psychosocial factors on low back pain: Longitudinal results from the Belstress study*, *Spine*, 32(2), pp.262-268.
- Ganesan, S., Archarya, A.S., Chauhan, R. & Acharya, S (2017) *Prevalence and risk factors for lower back pain in 1355 young adults. A cross sectional study*, *Asian spine journal*, 11(4), pp.610-617
- Gangopadhyay, S. & Dev, S. (2012) *Effects of lower back pain on social and professional life of drivers in Kolkata*, *Work*, 41, pp.2426-2433
- Hemington, K., Cheng, J., Bosma, R., Rogachov, A., Kim, J., Davis, K. (2017). *Beyond Negative Pain Related Psychological Factors*, *The Journal of Pain*, 18(9), 1117-1128.
- Hoogendoorn, W., Mireille, N., Bongers, P., Koes, B. & Bouter, L. (2000), *Systematic Review of Psychosocial Factors at Work and Private Life as Risk Factors for Back Pain*, *Spine*, 25(16), pp.2114-2125.
- Hoy, D., Toole, M. Morgan. & Morgan, C (2003) *Low back pain in rural Tibet*, *Lancet*, 361, pp.225-226
- Jadhav, A.V. (2016) *Comparative cross sectional study for understanding the burden of LBP among public bus transport drivers*, *Indian journal of occupational and environmental medicine*, 20(1), pp.26-30
- Kresal, F., Roblek, V., Jerman, A & Mesko, M (2015) *Lower back pain and absenteeism among professional public transport drivers*, *International journal of occupational safety and ergonomics*, 21(2), pp.166-172

- Kresal, F., Bertonce, T. & Mesko, M (2017), *Psychosocial factors in the development of low back pain among professional drivers*, *Ergonomics*, 50(2).
- Linton, S. (2001) *Occupational Psychological Factors Increase the Risk for Back Pain: A Systematic Review*, *Journal of Occupational Rehabilitation*, 11, pp.53-66
- Magnusson, M.L., Pope, M.H., Wilder, D.G. & Areskoug, B. (1996) *Are occupational drivers at an increased risk for developing musculoskeletal disorders*, *Spine*, 21(6), pp.710-717
- Miyamoto, M., Shirai, Y., Nakayama, Y. & Gembun, Y (2000) *A epidemiological study of occupational LBP in truck drivers*, *Journal of nippon medical school*, 67(3), pp.186-190
- Mozafari, A., Vahedian, M., Mohebi, S., Najafi, M. (2015) *Work-Related Musculoskeletal Disorders in Truck Drivers and Official Workers*, *Acta Medica Iranica*, 53(7),
- Najenson, D., Santo, Y. & Masharawi, M. (2010) *Low back pain among professional bus drivers: ergonomic and occupational-psychological risk factors*, *Israel medical association journal*, 12, pp.26-31
- Nazerian, R., Korhan, O & Shakeri, E (2020) *Work-related musculoskeletal discomfort among heavy truck drivers*, *International Journal of Occupational Safety and Ergonomics*, 26(2), pp.233-244
- Porter, J.M & Gyi, D.E (2002), *Prevalence of musculoskeletal troubles among car drivers*, *Occupational medicine*, 52(1), pp.4-12
- Ramdas, J & Jella, V (2018) *Prevalence and risk factors of LBP*, *International journal of advances in medicine*, 5(5), pp.1120-1123
- Ramond, A., Bouton, C., Richard, I., Roquelaure, Y., Baufreton, C., Legrand, E. & Huez, J. (2011) *Psychosocial risk factors for chronic low back pain in primary care—a systematic review*, *Family Practice*, 28(1), pp.12-21
- Rehn, I., Bergdahl, C., Ahlgren, C., Jarvholm, B., Lundstorm, R., Nilsson, T. & Sundelin, G (2002) *Musculoskeletal symptoms among drivers of all-terrain vehicles*, *Journal of sound and vibration*, 253(1), pp. 21-29
- Robb, M. & Mansfield, N (2007) *Self-reported musculoskeletal problems amongst professional truck drivers*, *Ergonomics*, 50(6), pp. 814-827
- Schultz, I., Crook, G., Meloche, R., Berkowitz, J., Milner, R., Zuberbier, O. & Meloche W. (2004) *Psychosocial factors predictive of occupational low back disability: towards development of a return-to-work model*, *Pain*, 107(1), pp.77-85
- Shelerud, R.A. (2006) *Epidemiology of occupational back pain*, *Clinics in occupational and environmental medicine*, 5(3), pp.501-528
- Skovron, M.L (1992) *Epidemiology of low back pain*, *Bailliere's Clinical Rheumatology*, 6(3), pp.559-573
- Suklan, J. (2017) *Psychosocial risk factors for low back pain and absenteeism among Slovenian professional drivers*, *Central European Journal of Public Health*,
- Tamrin, S.B.M., Yokoyama, K. & Jalaludin, J (2007), *The association between risk factors and LBP among commercial vehicle drivers in peninsular Malaysia, A preliminary result*, *Industrial health*, 45(2), pp.268-278
- Wippert, P.M., Fliesser, M., Krause, M. (2017). *Risk and Protective factors in Clinical Rehabilitation of Chronic Back Pain*, *Journal of Pain Research*, 10, 1569.
- World Health Organization (WHO). *International Classification of Impairments, Disabilities and Handcaps (ICIDH). A manual of classification relating to the consequences of disease*. Geneva: WHO; 1980
- Yun Li, J. & Huang, Y (2012), *Risk factors of LBP among the Chinese occupational population: A case control study*, *Spine*, 25(4), pp.421-429