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Assessment of Prevalence of Musculoskeletal Disorder, Health Seeking Behaviour and Associated Factors Among Taxi Drivers in Addis Ababa

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Abstract: Musculoskeletal disorder is common phenomenon among taxi drivers. However, there is shortage of data on musculoskeletal disorder among taxi drivers in Ethiopia. This study therefore aimed at determining the 12 -month prevalence of musculoskeletal disorder in different body parts, associated factors and health seeking behavior among taxi drivers in Addis Ababa, Ethiopia. The community based cross-sectional study design involved 371 taxi drivers from five selected sub-cities in Addis Ababa. Data on Musculoskeletal disorders experience, perception and health seeking behavior was collected through interview using the structured and Standardized Nordic questionnaires for analysis of musculoskeletal disorder and health seeking behavior. Data was analyzed using descriptive and logistic regression. Majority of taxi drivers (55%) reported experience of MSD in the past 12 months and low back was the most commonly reported pain site. Longer driving years had statistically significant association with MSD than shorter driving years. Most of the taxi drivers used health facility, massage and hot water to alleviate their musculoskeletal pain. Our findings suggest that MSD is highly prevalent among taxi drivers in Addis Ababa and the most common MSD site is low back. Refreshment training may help to reduce risk factors of MSD among taxi drivers in Addis Ababa.

Keywords: Musculoskeletal Disorder, Taxi Drivers, Prevalence, Health Seeking Behavior

1. Introduction

Musculoskeletal disorder (MSD) is an injury of the muscles, tendons, ligaments, nerves, joints, cartilage, bones, or blood vessels in the arms, legs, head, neck, or back that is caused or aggravated by work tasks such as lifting, pushing, pulling, repetitive task, awkward posture. Symptoms include pain, stiffness, swelling, numbness, and tingling. WMSDs have been a worldwide issue in many countries [1].

An estimated 9.5 million working days were lost due to WRMSDs. In many of the WRMSDs studies, risk factors that contribute to the development of WMSDs broadly categorized as workplace activities (ergonomics), workplace physical conditions, individual, psychosocial and organizational factors.

The workplace physical conditions include extreme temperature, poor lightning, work environment, etc. Individual factor includes medical history, obesity, physical activity, clothing, smoking and Leisure time activities. Psychosocial and organizational factor includes work demand, work control, relationship, support, job security, etc. It has been widely accepted that awkward and constrained postures result in musculoskeletal stress on different body regions of seated workers and are a major factor in the development of musculoskeletal disorders [2].

Musculoskeletal disorders are the most common cause of physical disability and severe long-term pain in working individuals. Population surveys estimated that for a one-month period of recall, up to 50% of people in the general population experience musculoskeletal pain at one or more anatomical sites. These public health problems were not well recognizing due to data limitation the area of work related disease and absence of an effective and continuous monitoring program regarding to occupational health and safety. The population at a high risk includes nursing facilities, transportation, mining, food processing, leather

tanning, heavy and light manufacturing. Transport workers have been found to be at high risk of developing work related musculoskeletal disorders (WRMSDs) [3].

In general different literatures revealed different magnitude of MSD among different drivers. Example study conducted among truck drivers in United kingdom's revealed MSD prevalence of 81% [23], in Tricity among Bus drivers 53% [3], in Ghana among taxi drivers 70.5% [6], in Nigeria among taxi drivers 89.3% [26].

Many factors make taxi drivers distinct from other professions in terms of exposure to risk of work-related low back disorders. First is the time factor; because, taxi drivers spent longer time in driving than other professions [15]. Second the design of automobile seat, can affect the posture of drivers and posture in turn also can influence both comfort and physical conditions of a driver [16-18]. Work-related musculoskeletal disorders (WRMD) and other postural damage may result in physiological illness that may develop over a long period due to prolonged mechanical stresses imposed on the musculoskeletal system [19].

In general different literatures revealed different magnitude of MSD among different drivers. Example study conducted among truck drivers in United kingdom's revealed MSD prevalence of 81% [23], in Tricity among Bus drivers 53% [3], in Ghana among taxi drivers 70.5% [6], in Nigeria among taxi drivers 89.3% [26].

Therefore, even though the prevalence and risk factors of MSD among taxi drivers in Ethiopia couldn't be differ from other developing countries in Africa, there is no sufficient evidence on general MSD prevalence and all associated factors. But, only one study was conducted among taxi drivers in Addis Ababa with prevalence of 64% [7] which was not incorporate the whole parts of the body which are susceptible for MSD and their health seeking behavior to alleviate the problem was not incorporated.

2. Materials and Methods

The proposal of this thesis was approved by Institutional Review Board (IRB) of Addis Ababa university School of public health and ethical clearance was obtained. Five sub-cities of Addis Ababa were selected using simple random sampling from the total ten sub-cities of Addis Ababa. From the five sub-cities, based on their sample frame, the total of 387 study subjects was selected using probability proportional to size (proportional allocation). The source population of this study was all taxi drivers of Addis Ababa and the design was community based cross sectional.

To ensure data quality, the questionnaires were pre-tested on 5% of the total sample size at similar Setup but in non-selected sub-cities of Addis Ababa, among Taxi drivers and based on this result any ambiguity, confusion and things that needs correction and gaps in the questionnaire were corrected before the actual study. Data were collected through face to face using structured, pretested and customized standard Nordic Questionnaires after translation to local language which was Amharic.

The data were checked for completeness and entered in to Epi Info version 7 and were exported to SPSS version 21 and analyzed. Descriptive analysis like frequency, percentage, mean, SD, maximum and minimum were presented using different tables graphs and bi-variate analysis (one independent with dependent variable) was under taken in Binary Logistic regression to determine crude odds ratio of all risk factors independently and risk factors with p-value<0.2 were selected and re-entered to multiple variables logistic regression and analyzed again to determine the adjusted odds ratio. Then variables with p-value<0.05 were declared as risk factors of MSD among taxi drivers in Addis Ababa.

3. Result

3.1. Socio-Demographic Characteristics of the Study Participants

A total of 371 taxi drivers were participated in this study with response rate of 95.9% and Out of the 387 taxi drivers contacted for the study, 16 had terminated the study when passengers arrived, which turned 4.1% of the questionnaire incomplete. All of the study participants were males. The median age of the participants was 33 years and with IQR, Minimum and Maximum of 13, 21 and 62 respectively. The median of their monthly income was 2400ETB with IQR, Minimum and Maximum of 800,800 and 5000ETB respectively. Out of the total participants, about 160 (43.1%) were single or not married and about 199 (53.6%) were married. Regarding their educational level, majority of the participants were attended primary school, 212 (57.1%) and the least about 6 (1.6%) were at degree level. When we see religion distribution, majority of the participants were belongs to orthodox Christianity which accounts171 (46.1%).

When we see the monthly distribution of taxi drivers, those whose their monthly income is≥4000 were 4.85% and majority of their monthly income fall within the range of 2001-3999 by accounting 53.10 %.

3.2. Magnitude of MSD

Table 1. *Prevalence of MSD among different body parts among taxi drivers in the past 12 months and 7days in AA, 2019 (204cases/371).*

Different body parts	12 months MSD prevalence		7 days MSD prevalence	
	N	%	n	%
Neck	43	11.6	7	1.9%
Shoulder	115	31	32	8.6%
Upper back	72	19.4	23	6.2%
Elbow	25	6.7	7	1.9%
Wrist/hand	31	8.4	5	1.3%
Lower back	199	53.6	92	24.8%
Hips/thigh	64	17.3	34	9%
Knees	68	18.3	13	3.5%
Ankle/feet	27	7.3	7	1.9%

About 204 (55%) of the respondents reported that they have experienced musculoskeletal disorder in the last 12 months with an average frequency of twice (2.3 ±0.9). Out of this percent 15 (4%) of MSD magnitude was related to

accident. On the other hand 107 (28.8%) of the respondents reported that they have experienced MSD in the past 7 days (Table 1).

Out of 204 respondents that experienced MSD in the last 12 months, 102 (50%) of them were prevented from normal working days and as a result about 419 working days on average (4 ± 2.6) working days were lost.

Out of 371 taxi drivers, 204 (55%) of the cases that experienced MSD in the last 12 months, complained the following factors as the real cause of their musculoskeletal disorder with their respective frequency and percentage. Trauma/accident 15 (4%), bending/twisting 169 (45.6%), WBV during driving 135 (36.4%) and prolonged sitting 123 (33%) (Figure 1).

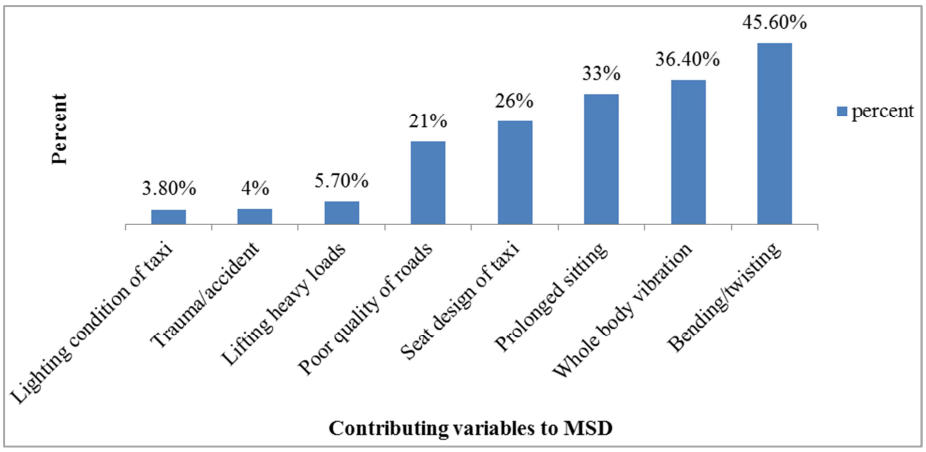

Figure 1. *The perception cause of MSD complained by 204 taxi drivers in Addis Ababa/2019.*

3.3. Driving Experiences and Anthropometric Measurements of the Participants

The median and IQR of driving experience of the respondents were 7 and 6 with the minimum and maximum driving years of 1 year and 30 years respectively. The median and IQR of driving duration of the respondents were 8 and 2 hours per day. About 190 (51.2%) of the respondents were used to drive other vehicle prior to taxi with median of 4 years. The median and IQR of driving days per week were six days and one day respectively.

The median and Inter Quartile Range (IQR) of height (m) of the participants were 1.7, 0.1, respectively and, the median and Inter Quartile Range (IQR) of body mass index of the participants were 22.8 and 2.2 respectively. Majority of taxi drivers' BMI fall within the range of 18.5-25 which accounts 94.3% and BMI ≥25.5 accounts 5.1% of the taxi drivers. The mean and SD of the weight of the participants' were 66 ± 5.9 respectively.

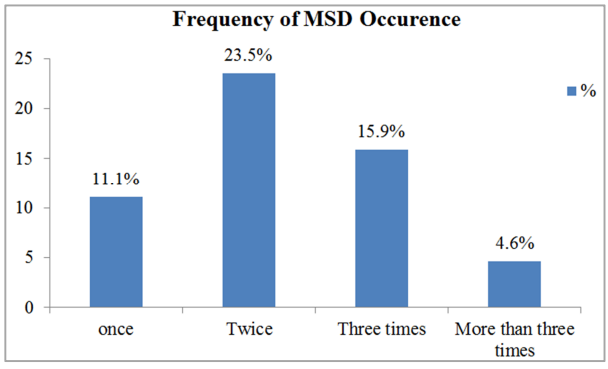

Figure 2. *Frequency of MSD occurrence among taxi drivers in Addis Ababa in the last 12 months/2019 (204cases/371).*

Regarding the frequency of musculoskeletal disorder occurrences, from the total of 204 cases experienced MSD, 87 (23.5%) of the cases experienced twice in the last 12 months while the least about 17 (4.6%) of the cases experienced more than three times (Figure 2).

3.4. Psychosocial Factors

Regarding perception of cause of stress, about 289 (77.9%) of the respondents perceive that taxi driving can cause or leads to stress and in similar manner regarding job satisfaction about 164 (44.2%) of the respondents were dissatisfied by taxi driving.

3.5. Behavior and the Working Environment

About 332 (89.5%) of respondents reported that the lighting condition of their Taxi was good while the rest 39 (10.5%) of respondents reported that the lighting condition of their taxi were poor. A total of 97 (26%) of the study participants reported that the seat design of their taxi were not comfortable. Pertaining behavioral characteristics, about 157 (42.3%) of the respondents reported that they consume alcohol on average 2.14± 0.98 days per week and in similar manner about 15 (4%) of the study participants reported that they smoke cigarette on an average and SD of 2.9+ 0.64 pieces of cigarettes per day. About 71 (19%) of the participants reported that they chew kchat on an average of 2.3±0.9 days per week.

Only about 89 (24%) of the respondents reported that they perform physical exercises on an average for 17.6±4.8 minutes per-day for an average and SD of 4.3± 0.9 days per week. On the other hand about 103 (27.8%) of the participants reported that they did not use seat belt frequently

due to discomfort and negligence problems.

Health seeking behavior of the participants.

Out of 204 (55%) of the cases that developed MSD in the past 12 months, only 70 (34.3%) of them reported that they took treatment action immediately following the occurrence of MSD while the rest134 (65.7%) did not seek for help. From the total sample (n= 371) about 225 (60.6%) said that they never take treatment action immediately following the occurrence of MSD for the reason that they under estimate the case of MSD and unless it gets worse. Out of 225 the study participants that were not interested to take early treatment of MSD, about 134 (59.6%) already developed MSD.

Most of the time about 232 (62.5%) of the participants prefer modern treatment for the reason that it is effective, safe and treats patients with respect and dignity whereas 139 (37.5%) of the participants prefer/seek traditional treatment to treat MSD for the reason that it is convenient, cost effective and saves time.

When we see the specific health seeking preferences of the taxi drivers, majority which is about 65.5% prefer to treat MSD followed by hot water like sodare, wondo genet and Filwuha, by accounting 43.7 % (Table 2).

Table 2. *The most common practice (action taken) by Taxi drivers to alleviate MSD in Addis Ababa 2019.*

Type of treatment action	N	Percent
Health facility	243	65.50%
Hot water	162	43.70%
Massage	111	29.90%
Holly water	80	21.60%
Wogesha	70	18.90%
Self prescribed drugs	43	11.60%
Herbal preparation	28	7.50%
Others	21	5.70%

Multiple variables/multi variate analysis of variables with p-value of <0.2 in bi-variate analysis.

The odds of MSD among taxi drivers who sit for prolonged time, is 2.79 times more likely than those who did not sit for prolonged period (p-value=0.003, AOR=2.79 and 95%CI (2.301, 9.028)) (Table 3).

Table 3. *Multivariate analysis of MSD among taxi drivers in Addis Ababa, May/2019.*

Variables	P-value	AOR	95% C. I. for AOR	
			Lower	Upper
prolonged sitting (yes)	0.003*	2.79	2.301	9.028
The seat design of taxi (not comfortable)	0.002*	2.45	2.18	17.103
Not performing physical exercises	0.006*	2.17	2.897	11.677
Driving Experiences (>=10 yrs)	0.011*	3.01	2.082	28.314

Where:

" * "variable with p-value <0.05 which means they are statistically significant.

P-value=probability value AOR = Adjusted odds ratio CI=confidence Interval

4. Discussion

The study was aimed at determining the prevalence of musculoskeletal disorder, health seeking behavior and risk factors among Taxi drivers in Addis Ababa. Different literatures revealed that the prevalence of musculoskeletal disorder among urban taxi drivers ranges from53% to 89 % [3, 6, 7, 26]. The prevalence of this study (55%) is greater than the study finding reported in Great Britain with prevalence of 44% MSD among general population [1]. The variation could be due to differences in the overall setting of the study areas, as well as the differences in occupation and target group on which the study was conducted completely different. On the other hand 12-month prevalence rate of MSD among taxi drivers (55%) is similar to study conducted in Tricity, India that was reported 53% prevalence of MSD among Bus drivers [3]. The finding of this study's 12 months prevalence of MSD is smaller than the result reported in Ghana which was musculoskeletal prevalence rate of 71% among taxi drivers [3]. In similar manner the finding of this study is smaller than the result reported in Nigeria with high MSD prevalence rate of 89% among taxi drivers [26]. The difference could be due to sample size difference and study setting. On the other hand the prevalence of this study (55%) relatively smaller than the study conducted in Addis Ababa with 64% of prevalence rate of low back pain [7]. But in the present study the overall prevalence rate of MSD is 55% whereas the low back pain is 53%. The discrepancy could be due to probably the time gap and the conditions of the vehicles and the roads on which the taxi drivers in the present study normally drive are probably better than those in previous studies.

When we compare prevalence of musculoskeletal disorder among taxi drivers in different body parts with the studies conducted in different parts of the region, the prevalence of musculoskeletal disorder of shoulder is 31% which is similar to the study conducted in Nigeria with shoulder musculoskeletal disorder prevalence rate of 30% [26]. In a similar manner the prevalence of neck MSD of this study is 12% which is relatively similar to, but also slightly lower than studies conducted in Tricity, India [3] and Ghana [6] with a prevalence of 17.3% and 15% respectively.

This result also showed that the prevalence of ankle/feet musculoskeletal disorder is 17% which is exactly similar with study conducted in Nigeria among taxi drivers with prevalence rate of 17% [26]. The prevalence of low back pain (53%) of this study is greater than the prevalence of low back pain conducted in Tricity [3] and Ghana [6] with 30.3% and 34.3% respectively but relatively smaller than study conducted in Nigeria [31] with prevalence of low back pain 64.8%. When we compare driving experiences and psychosocial factors, this study revealed that the mean driving years was 7.96 ± 4.95 years where as in Ghana and Nigeria 4.2± 3.3 years and 16±9.3 years respectively [6, 31]. But the mean driving days per week in this study is relatively similar to the study conducted in Ghana which is 6± 0.6 in this study and 5.1±1.2 days per week in Ghana [6].

Regarding job perception and job dissatisfaction, 77.9% and 44.2% in this study while 84.7% and 28.7% respectively in Ghana [6].

Regarding the health seeking behavior of the study participants, most of the time about 232 (62.5%) of the participants prefer modern treatment for the reason that it is effective, safe and treats patients with respect and dignity whereas the rest 139 (37.5%) of the participants prefer traditional treatment to treat MSD for the reason that it is convenient, cost effective and saves time.

From the total of 204 (55%) of the cases that reported MSD, only 70 (47.9%) of them took treatment action immediately following the occurrence of musculoskeletal disorder while the rest 134 (59.6%) did not for the reason that they under estimate the severity of MSD unless it gets worse.

Regarding preference of treatment of MSD, out of the total cases 7.5% used herbal preparation, 11.6% self-prescribed drugs, 43% hot water, 65.5% health facility and others 5.7% where as in study conducted in Nigeria among taxi drivers the preference of musculoskeletal disorder treatment was, 32% herbal, 35.8% self-prescribed drugs, 2.5% hot water, 3.1% health facility and 4.4% others [26]. The cause for this difference could be probably socio-cultural, beliefs and perception, cost effectiveness, status of awareness and the time frame in which study was conducted may affect their preferences to treat MSD.

Pertaining the associated factors of musculoskeletal disorder among taxi drivers, bending/twisting, prolonged sitting, Seat design of taxi, regular physical exercises and Driving experiences are significantly associated with musculoskeletal disorder. In this study, not comfortable seat design contributes 81.4% of MSD among taxi drivers and this prevalence is slightly similar to the study conducted in Malaysia which revealed 86.4% of MSD prevalence related to not comfortable seat [31]. The taxi drivers that drive taxi more than 10 years are 3times more likely to develop musculoskeletal disorder than those drive less than 10 years. Taxi drivers that frequently bend/twist are 1.673 more likely to develop musculoskeletal disorder than those did not bend/twist frequently. Taxi drivers who sit for a longer period during driving are 2.79 more likely to develop MSD than those who did not sit for a longer period. Participants whose their seat design were not comfortable are 2.45 times more likely to develop MSD than those with comfortable seat design. And those who didn't perform physical exercises regularly are 2.17 times more likely to develop MSD than those perform physical exercises regularly but study conducted in Ghana revealed that the odds of MSD among taxi drivers that did not perform of physical exercise was 3times more likely than that performed physical exercises [3].

5. Conclusions

In conclusion, the estimated one-year prevalence of general musculoskeletal disorder within the taxi drivers was high. This study found a high prevalence of musculoskeletal pain among taxi drivers with low back the most common site of the pain whereas elbow is the least reported pain site. The longer the years of driving experience the greater the chances of developing musculoskeletal disorder. A large number of taxi drivers with musculoskeletal disorder are not interested for early treatment of MSD until the case get worse. Therefore, these findings call for preventive to organize enlightenment training for drivers on how to avoid or probably reduce the risk factors of musculoskeletal pain like frequent bending/twisting, prolonged sitting, improving seat design and regular physical exercises among taxi drivers in Addis Ababa.

Data Availability

The data used to support the findings of this study may be released upon application to the ethical review board of the college of Health Sciences.

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Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] S T. Assessment of Prevalence and Associated Factors of Work Related Musculoskeletal Disorders among Cobble Stone Workers in Addis Ababa, Ethiopia, June, 2017.

[2] W B. Self-Reported Work Related Musculoskeletal Disorders and Determinant Factors of Female Beauty Salon Hair Dressers, In Addis Ababa, Ethiopia. 2016.

[3] Lalit, Retasha Soni, Garg S. Prevalence of Musculoskeletal disorder among bus driver in Tricity. Int J Physiother. October (2015); 2(5): 850-4.

[4] Girish MM, D A. The Global Burden of Musculoskeletal Disorders. Business briefing 9: 136-41.

[5] Magnavita M, Elovainio M, De Nardis I. Environmental discomfort and musculoskeletal disorders. Occupational Medicine 2011; 61: 196-201.

[6] Abledu JK, Offei EB, GK A. Occupational and personal determinants of musculoskeletal disorders among urban taxi drivers in Ghana. Int Sch Res Notices 2014.

[7] Wanamo M E, Abaya S W, B AA. Prevalence and risk factors for low back pain (LBP) among Taxi Drivers in Addis Ababa, Ethiopia: Ethiop J Health Dev. 2017; 31(4).

[8] Karwowski W, WS M. Occupational ergonomics: principles of work design. CRC Press, Florida, 2003.

[9] YasobantS, P R. Work-related musculoskeletal disorders among health care professionals: A cross-sectional assessment of risk factors in a tertiary hospital. India Indian J Occup Environ Med. (2014); 18: 75-81.

[10] Magnusson ML, Pope MH, Wilder DG, B A. Are occupational drivers at an increased risk for developing musculoskeletal disorders?) Spine (Phila Pa 1976). 1996; 21: 710-7.

[11] Hulshof CT, Verbeek JH, Braam IT, Bovenzi M, FJ vD. Evaluation of an occupational health intervention programme on whole body vibration in forklift truck drivers: a controlled trial. Occup Environ Med. 2006; 63: 461-8.

[12] Krause N, Ragland DR, Fisher JM, SL S. Psychosocial job factors, physical workload, and incidence of work-related spinal injury: a 5-year prospective study of urban transit operators. Spine (Phila Pa 1976). 1998; 23: 2507-16.

[13] Chen JC, Chang WR, Chang W, D C. Occupational factors associated with low back pain in urban taxi drivers. Occup Med (Lond). 2005; 55: 535-40.

[14] Johnston, Culberson I. Loss Analysis Report.

[15] Raanaas RK, Anderson, Talamanca FI, Cini C, and, Varricchio GC. Effects of prolonged auto vehicle driving on male reproduction function, a study among taxi drivers. Am J Ind Med. 1996; 30: 750-8.

[16] M. S S, McCormick E. J. Human Factors in Engineering and Design. Psychology Series McGraw-Hill, Inc, seventh edition.

[17] Byrns G, and AJ, Curbow B. Attributions, Stress and Work-related Low Back Pain. Applied Occupation Environmental Hygiene 2002; 17(11): 752-64.

[18] Farzana I. Bus Driver's Cab-Engineering Design Solutions: Future Considerations. Optimal Performance Consultants. (2006).

[19] Haims C. H a, Carayon. Theory and practice for the implementation of in-house", continuous improvement participatory ergonomic programs. Applied ergonomics. 1998; 29(6): 461-72.

[20] LTP. Social Security Organisation 2015: 393.

[21] Aini N, B. H. Prevalence of Musculoskeletal Symptoms and Its Associated Risk Factors Among Bus Drivers. International Journal of Public Health and Clinical Sciences 2015; 2(1): 34.

[22] Tamrin BM, Yokoyama K, Aziz N. Association of Risk Factors with Musculoskeletal Disorders among Male Commercial Bus Drivers in Malaysia.. Human Factors and Ergonomics in Manufacturing. 2014; 24(4): 369-85.

[23] Robb MJM, NJ M. Self-reported musculoskeletal problems amongst professional truck drivers. Ergonomics. 2007; 50(6): 814-27.

[24] Szeto GPY, P L. Work-related Musculoskeletal Disorders in Urban Bus Drivers of Hong Kong.. Occupational Rehabilitation. 2007; 17(2): 181-98.

[25] Mozafari A, Vahedian M, S M. Workrelated musculoskeletal disorders in truck drivers and official workers.. Acta Medica Iranica. 2015; 53(7): 432-8.

[26] Akinpelu A. O., Oyewole O. O., and OAC, O. OR. Prevalence of Musculoskeletal Pain and Health seeking Behavior among Occupational Drivers in Ibadan, Nigeria, Afr J Biomed Res. May 2011; 14: 89-94.

[27] Porter JMa, GYI DE. The prevalence of Musculoskeletal troubles among car drivers. 5. 2002; 1.

[28] RL, S G. Factors associated with self-reported back pain prevalence: A population based study. Chronic Disorders. 1985; 38(8): 691-702.

[29] JB, B. Y. Identification of ergonomics problems by means of questionnaires for musculoskeletal troubles; International Ergonomics Association 9th Congress. 1985: 424-6.

[30] JA J. Work-related and non-work-related musculoskeletal symptoms. Applied Ergonomics 1994; 25: 248-51.

[31] Noor Sazarina Mad Isa, and MMR, Sahani M. MUSCULOSKELETAL DISCOMFORT AND ITS ASSOCIATED RISK FACTORS AMONG TRAIN DRIVERS, Malaysian. Public Health Medicine. 2018; Special Volume (1): 98-106.