# 65 - ANALYSIS OF OCCUPATIONAL RISKS AND WORK-RELATED DAMAGE TO HEALTH IN BUS DRIVERS WORKING FOR URBAN COMPANIES IN OSASCO, 2006.

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## INTRODUCTION

Work and its consequences date back to 2360 BC with the first reference found in Papyrus Seller II (SOTO, 1978; CORREIA, 2004).

However, the relationship between work and diseases has been known since the Roman Empire when work was regarded as a generator and mordifier of living, growing, and dying conditions (ROSEN, 1994).

An Italian physician and teacher, Bernardino Ramazzini is regarded as the father of occupational medicine. In 1690-91, he described the diseases 50 diseases affecting different groups of workers in his *De Morbis Artificum Diatriba*, considered the first comprehensive work on occupational disease (MENDES, 1980; ARAÚJO-ALVAREZ & TRUJILLO-FERRARA, 2002; PAULINO, 2002).

As for bus drivers, many factors account for discomfort at work and work-related fatigue and tiredness. On the one hand, bus driver's cabin is not always fit for anthropometric measures. For instance, bus driver's seat can not be appropriately adjusted. On the other hand, repetitive motion can lead to work-related musculoskeletal disorders/repetitive strain disorders. In addition, bad condition of avenues, streets, and roads, quarrels with bus users, discharge, fear of car-car and car-pedestrian crashes, as well as of assaults, heavy traffic, prolonged working days, and sleep disorders also play a role (SOUZA & SILVA, 1998; COSTA and col., 2003; FILHO, 2003, NERI and col. 2005).

According to SACCO and col. (2003), fatigue and tiredness results from operating the steering wheel because the tension upon the trapezius (upper fibers) and the deltoid muscle is increased when the shoulder is flexed.

However, the most frequent site of pain in bus drivers is the lumbar region. Lumbar pain is associated with discomfort at and after work and can even result in the inability to perform activities of daily living (JUNIOR & MENDES, 1999; QUEIRÓGA & MICHAELS, 1999; QUEIRÓGA, 2001).

One of the causes of pain is the lack of adjustability in bus driver's cabins. As a result, pelvic anteversion and lombar lordosis are increased so as to improve visibility. They, however, lead to inappropriate position, increasing the risk for disk herniation (SACCO e col.,2003; LIMA e col., 2005).

Whole-body or local vibration combined with few break periods, prolonged working days, long-lasting exposure to the source, and inappropriate postures can lead to inflammation in the tissues of the hand with loss of muscular power (FERNANCES & MORATA, 2002; VALVERDE, 2003; FILHO, 2003; FILHO and col., 2003). Increased muscular strain results in increased muscular injuries to the arms and and shoulder, thus augmenting the risk for cumulative trauma disorders (FILHO, 2003).

For the above reasons, more studies are needed to investigate workstations since many bus driver's cabins are not fit for anthropometric measures and to define how to prevent work-related diseases.

## AIM

The present study aimed to evaluate the influence of the workstation upon work-related sickness in bus drivers.

## MATERIAL AND METHODS

The epidemiological cross-sectional descriptive and inductive study included a convenience sample of 200 bus drivers working for five different companies of urban transport in Osasco, SP.

Bus drivers who were candidates to study subjects were invited to fill out a previously validated standardized questionnaire used for direct information collection. The present study complied with ethical requirements. Study subjects were informed of the importance and aims of the present research study and filled out the Freely Given and Informed Consent Form in compliance with the Resolution 196/96 of the National Council of Health (Health Ministry).

Study results are presented as percentages and absolute numbers in simple frequency graphs and tables.

## RESULTS

Working conditions of bus drivers do not favor a good performance, poses unhealthy demands to the organism, and, as a result, increases the risk of bus transport.

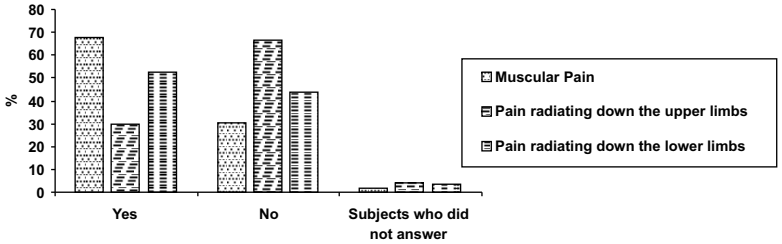
**Table I.** Percentage and number distribution of the number of daily hours of work and duration in years of bus-driver profession in Osasco city.

| Duration in years of bus-driver profession | Nº | % | Number of daily hours of work | Nº | % |
|---|---|---|---|---|---|
| Less than 01 | 14 | 7,00 | 08 hours | 32 | 16,00 |
| 01 ? 03 | 23 | 11,50 | 08 ? 12 hours | 132 | 66,00 |
| 03 ? 06 | 29 | 14,50 | > 12 hours | 29 | 14,50 |
| 06 ? 09 | 28 | 14,00 | Number of study subjects who did not answer | 07 | 3,50 |
| More than 09 | 96 | 48,00 | — | — | — |
| Number of study subjects who did not answer | 10 | 5,00 | — | — | — |
| Σ | **200** | **100** | Σ | **200** | **100** |

The present study found that 48% have worked as bus drivers for more than 9 years, and working days of 8 to 12 hours were reported by 66%. However, overtime is not uncommon. Longer working days associated with prolonged exposure to sources can activate pathogenetic factors leading to disease: muscular pain affecting upper and/or lower limbs was reported by 67.5% of bus drivers (Graph 1). As shown in Graph 3, the source of muscular pain is believed to be the lack of seat adjustability

and prolonged forced postures, as well as the operation of the clutch and gear change involving repetitive motion that can result in work-related musculoskeletal disorders/repetitive strain disorder (cumulative trauma disorders), as indicated by SOUZA & SILVA (1998), JUNIOR & MENDES (1999), and FILHO (2003). The above mentioned authors concluded that equipment with deficiencies in design and construction and repetitive motion can result in cumulative trauma disorders, when associated with other external factors, such as vibration and prolonged working day, aggravating factors that lead to mental and physical disorders. Vibration poses an additional tension upon tendons. One must remember that each subject reacts differently to injury.

**Graph 1.** Percentage distribution of muscular pain and pain radiating down the upper limbs, lumbar region, and lower limbs in bus drivers from Osasco, SP.

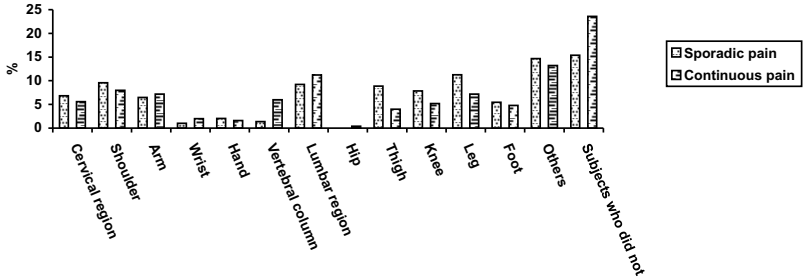



Pain radiating down the lower limbs (52.5%) was reported more frequently than that radiating down the upper limbs (29.5%). Discomfort during gear changing was reported more frequently than discomfort during the operation of the steering wheel (7.54%), as shown in Graph 3.

For the purpose of the present study, sporadic pain was defined as pain during the working day. Continuous pain was defined as pain during the working day, daily rest between working days, and days off. The present study found that sporadic pain radiating down the upper limbs affected the shoulders, hands, and arms in, respectively, 9.56%, 2.05%, and 6.48% while continuous pain radiating down the upper limbs was reported to affect the shoulders, hands, and arms in 8.0%, 1.60%, and 7.20%, respectively (See Graph 2).

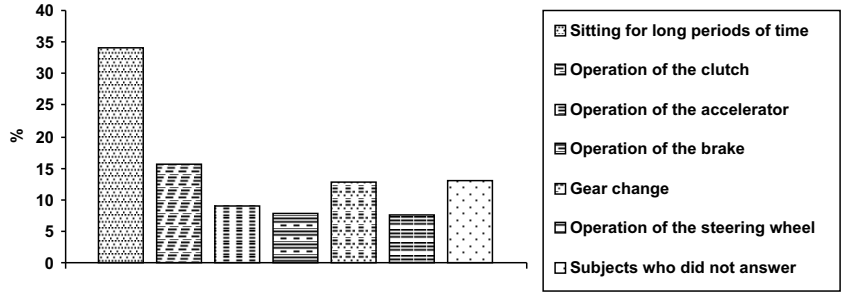
According to SOUZA & SILVA (1998), JUNIOR & MENDES (1999), and SACCO and col. (2003), pain is related to shoulder flexion in operating the steering wheel, maintenance of the same posture for long periods of time, lack of seat adjustability, and vibration to which bus drivers are exposed.

**Graph 2.** Percentage distribution of sporadic and continuous pain in bus drivers from Osasco, SP.




The present study found that sporadic pain radiating down the legs affected the leg and lumbar region in 11.26% and 9.22%, respectively, while continuous pain radiating down the legs affected the leg and lumbar region in 7.20% and 11.20%, respectively. According to ACHOUR JÚNIOR (1999), SACCO e col. (2003), and LIMA e col. (2005), pain is due to the maintenance of sitting position for long periods of time and lack of seat adjustability. As a result, different body regions are injured by strain and tender points appear. Pelvic anteversion and lombar lordosis are increased so as to improve visibility. On the other hand, they lead to inappropriate position, increasing the risk for disk herniation and negatively affecting worker's performance.

**Graph 3.** Number and percentage distribution of activities believed to be the source of pain according to bus drivers from Osasco, SP.




According to QUEIRÓGA & FERREIRA (2005), driving a bus requires sustained contraction of a given muscle group, specially in the arms and legs, thus increasing the load upon the vertebral column.

**CONCLUSION**

Study results suggest that bus driver's cabin with deficiencies in design and construction leads to musculoskeletal disorders and, as a consequence, to decreased performance. This factor in combination with vibration, prolonged working days of 8 to 12 hours, overtime, length of break periods, can aggravate muscular pain since vibration increases the tension upon tendons.

With the appearance of pain in upper and lower limbs combined with prolonged sitting, work-related musculoskeletal disorders/repetitive strain disorders can develop. In addition, lumbar region can also be affected.

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**ANALYSIS OF OCCUPATIONAL RISKS AND WORK-RELATED DAMAGE TO HEALTH IN BUS DRIVERS WORKING FOR URBAN COMPANIES IN OSASCO, 2006.**

**ABSTRACT:**

Bus equipment with deficiencies in design and construction, associated with other factors, such as vibration, forced postures for prolonged periods of time, duration of bus-driver profession, length of working day, leads to work-related damage to health in bus drivers continuously exposed to the risk-producing source. To evaluate the influence of the workstation upon work-related sickness in bus drivers. The epidemiological cross-sectional descriptive and inductive study included 200 bus drivers working for five different companies of urban transport in Osasco, SP. Study subjects were asked to fill out a form, the questions being used as study variables. Study results are presented as percentages and absolute numbers in simple frequency graphs and tables. The present study complied with ethical and legal requirements. 48% of study subjects had worked as bus drivers for more than 9 years; 66% of study subjects worked 8 to 12 hours daily; 52.5% presented pain radiating down the legs with 11.26% and 9.22% reporting sporadic leg and lumbar pain, respectively, while 7.20% and 11.20% reported continuous leg and lumbar pain, respectively; 29.5% reported pain radiating down the upper limbs with 9.56%, 2.05%, and 6.48% reporting sporadic pain in the shoulders, hands, arms, respectively, while 8.0%, 1.60%, and 7.20% reported continuous pain in the shoulders, hands, and arms, respectively. Study results suggest that bus driver's cabin with deficiencies in design and construction leads to musculoskeletal disorders and, as a consequence, to decreased performance, specially when associated with prolonged

exposure to external factors.

KEY-WORDS: Bus drivers; muscular pain; vibration.

**ANALYSE DES PÉRILS ET DES AGRAVES POUR LA SANTÉ ET L'OCCUPATION DES CHAUFEURS D'AUTOBUS QUI TRAVAILLENT À LA VILLE DE OSASCO (SP).**

**RÉSUMÉ:**

Les equipements sans conservation et les places de travail précaires, allies à plusieurs d'autres facteurs, comme des vibrations, des attitudes pas convenables pendant long temps, des journées beaucoup étendues, tout celá a favorisé un très grand nombre de risques pour la santé des chauffeurs, Presque toujours exposés à ces dangers. L'objectif principal de cette recherché c'est de vérifier l'influence dês places de travail sur la santé dês cheuffeurs d'autobus. Les chauffeurs ont répondu à plusieures questions, don't les resultants - en utilizant de l'statistique paramétrique e pas paramétrique - sont exposés au moyen des graphiques et des tableaux. Les resultants sont les suivants: 48% des chauffeurs registrent plus au moins neuf (9) années de travail; 66% travaillent de huit (8 heures) a douze (12 heures) par jour; 52,5% manifestent que ils ont mal aux members inférieurs; 11,26% registrent mal aux jambs et a la region lombaire; 7,20% registrent mal très intense aux jambes; 29,5% registrent mal très intense aux members supérieurs; 11,20% registrent mal a la region lombaire; 9,56% registrent mal aux mains, aux bras et aux épaules; 2,05% registrent mal aux bras; 6,48% registrent mal très intense aux épaules, 8% aux mains; 1,60% aux bras.

MOTS-CLEFS: Chaufeurs D'autobus; douleurs musculaires;et vibration.

**ANÁLISIS DE LOS RIESGOS OCUPACIONALES Y DAÑOS A LA SALUD EN LOS CHOFERES DE OMNIBUS QUE SIRVEN AL MUNINCÍPÍO DE OSASCO, SAO PAULO, 2006.**

**RESUMEN:**

Equipos mal estructurados y puestos de trabajo precarios, asociados a factores externos como vibración, postura inadecuada por tiempo prolongado, tiempo de ejercer la profesión, horas trabajadas y jornadas extensas, producen daños a la salud de los choferes profesionales de ómnibus, dado que constantemente ellos mantienen contacto con la fuente generadora de riesgos. Verificar la influencia del puesto de trabajo en el proceso de enfermedad de los choferes de ómnibus. Se realizó un estudio de tipo epidemiológico, transversal, descriptivo, cuya muestra de conveniencia estuvo compuesta por doscientos choferes (n=200) de ómnibus que trabajan en el Municipio de Osasco (Sao Paulo), los cuales respondieron un formulario, cuyas preguntas fueron utilizadas como variables. Los datos compilados serán presentados en tablas y gráficos de frecuencia simples expresados en números y porcentajes, con tratamiento estadístico paramétrico (media y desvío padrón) y no paramétrico, a través del cálculo de la mediana y del Test de Fisher. Los aspectos éticos y legales fueron observados. Verificase que el 48% de los choferes tienen más de 9 años de profesión; 66% trabajan de 8 a 12 horas por día; 52,5% refieren dolores irradiados por los miembros inferiores; 11,26% relatan dolores esporádicos en las piernas y la región lumbar (9,22%); 7,20% dolores intensos en las piernas y 11,20% en la región lumbar; 29,5% refieren dolores irradiados en los miembros superiores; 9,56% dolores esporádicos en los hombros, manos (2,05%) y los brazos (6,48%); dolores intensos en los hombros (8,00%), en las manos (1,60%) y en los brazos (7,20%). Los resultados obtenidos sugieren que el puesto de trabajo cuando no está estructurado adecuadamente favorece el surgimiento de disturbios osteomusculares y disminuye el desempeño de las actividades profesionales, cuando son expuestos por tiempo prolongado a los factores de riesgo externos arriba explicados.

PALABRAS LLAVE: Choferes de ómnibus; dolores musculares; y vibración.

**ANÁLISE DOS RISCOS OCUPACIONAIS E AGRAVOS À SAÚDE EM MOTORISTAS DE ÔNIBUS QUE SERVEM O MUNICÍPIO DE OSASCO, S.P., 2006.**

**RESUMO:**

Os equipamentos estruturados inadequadamente com o posto de trabalho precário, gera danos à saúde dos profissionais motoristas de ônibus, associados aos fatores externos como a vibração, postura inadequada por tempo prolongado, tempo (em anos) na profissão, horas trabalhadas e jornadas extensas, que mantêm o profissional em contato com a fonte constantemente. Verificar a influência do posto de trabalho frente ao processo doença do profissional motorista de ônibus. O estudo realizado é do tipo epidemiológico, transversal, descritivo e indutivo, em cuja mesma conveniência participaram duzentos motoristas (n=200) de cinco empresas de transporte urbano que servem o Município de Osasco, SP, os quais após informados da importância e dos objetivos da pesquisa preencheram o Termo de Consentimento Livre e Esclarecido baseado na Resolução nº196/96 do Conselho Nacional de Saúde (MS). Os dados após compilados foram apresentados em tabelas e gráficos de freqüência simples expressas em números e percentagens. Podemos verificar que 48% trabalham acima de 9 anos na profissão; 66% apresentam uma carga horária de 8 a 12 horas por dia; 52,5% referem dores irradiadas nos membros inferiores, onde as dores esporádicas afetam11,26% nas pernas e 9,22% na região lombar; e as dores intensas afetam 7,20% nas pernas e 11,20% na região lombar; 29,5% referem dores irradiadas em membros superiores, onde 9,56% localizavam-se nos ombros, 2,05% mãos e 6,48% nos braços dores esporádicas; e 8,00 eram em ombros, 1,60% nas mãos e 7,20% nos braços dores intensas. Os resultados obtidos nos sugerem que o posto de trabalho quando não estruturado adequadamente favorece ao aparecimento de distúrbios osteomusculares que diminuem o desempenho das atividades profissionais, juntamente, quando expostos por tempos prolongados aos fatores externos.

PALAVRAS CHAVES: Motoristas de ônibus; dores musculares; e vibração.