Working conditions and health of the employees of public bus and trolleybus transport in Lithuania

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Key words: transport workers, occupational environment, lifestyle, psychosocial factors, health.

Summary. A questionnaire was used for investigation of 788 workers from three transport enterprises. The questionnaire was used for evaluation of occupational environment, lifestyle, psychosocial factors and self-evaluation of health. The most harmful occupational factors are unsatisfactory microclimatic conditions, diesel fuel, cooling oil, vibration, musculoskeletal load, and mental tension. Worker’s lifestyle isn’t healthy: 46% of them are smoking, 83% are drinking alcohol, 53% are physically inactive, 82% have bad nutrition regimen, 27% are everyday suffering from stressful situations. Main health impairments are musculoskeletal (46.2%), respiratory tract (22.2%), gastrointestinal (17.3%) and central nervous system (32.2%) diseases. Musculoskeletal disorders are statistically related to bad ergonomic work conditions, long workday hours, aged employees and long work experience of workers (p<0.05–0.002).

Introduction

There were 5023 economic operators of transport system in Lithuania in 2002, which made 7.4% of all economic operators of the country. It has been observed that 8% of employers of this activity have not been assessed with respect to the issues of safety and health at work. Owners of larger companies (previous state transport companies) do not have sufficient funds, not much attention is given to the safety of working machines, equipment, and tools, as well as their correspondence to the health requirements, there is a lack of personal safety and the first aid measures or they are not ready for use. Not all employees have their health examined, and around 20% of companies were never assessed in relation to hygienic conditions of working places. Seven percent of the employees work under hazardous conditions, while part of them work under extremely hazardous conditions. Employees are not provided with protective equipment in every fifth company, while in others they use worn-out measures not complying with the work safety and health standards. Therefore, the employees do not use them. Employers, breaking the laws, do not guarantee safe and healthy working conditions for drivers, as well as for the regime of their rest and nutrition (1, 2).

Health, level of the working capacity, professional reliability of transport employees and safety of traffic participants are influenced by the working conditions, ergonomic, psychological, and social factors as well as lifestyle (3, 4). Physical factors also make an impact on the transport workers during their professional activity, i.e. whole body and hand-arm vibration, noise, infrasound, etc., unfavorable microclimate, i.e. high and low air temperature, draughts, sun radiation, etc., chemical agents, i.e. carbon monoxide, sulphur dioxide, nitrogen oxides, aliphatic carbohydrates, formaldehyde, ozone, etc. (5–7).

Ergonomic (psycho-physiological) factors, which influence efficiency of work and health the most, include tension of central nervous system, musculoskeletal, sight, and hearing analyzers, frequent stressful situations. Safe work and health of employees are also closely related to the lifestyle, nutrition, harmful habits, and psychosocial factors.

The long-term and complex influence of these factors makes a negative impact on the health, work efficiency, and professional reliability of transport employees (Fig. 1). Without any doubt, this influences safety of traffic, trauma accidents, and subsequent serious psychological, moral, and economic consequences (8–11).
Health research carried out on the employees of transport shows that these people often suffer from respiratory, musculoskeletal, peripheral nervous, cardiovascular, gastrointestinal diseases. Rates of trauma accidents are also high (12–15). More than 50% of all drivers suffer from musculoskeletal disorders, which are manifested through tension, pain and decreased work capacity (13, 16, 17).

The aim of this study is to make an analysis of occupational, lifestyle, and psychosocial factors of transport workers and assessment of their relation to the health of employees.

**Materials and methods**

The study was carried out in three public transport companies (two bus companies and one trolleybus company) in 2001–2002, which had 1857 employees in 2002. The special questionnaire prepared by the Department of Environmental Health and Occupational Medicine, Kaunas University of Medicine, was used in the study. The questionnaire included the following parts: documentary, impacts of lifestyle, psychosocial and professional factors, complaints about health, and assessment of health (78 questions in total). One thousand questionnaires were distributed, which were filled by 78.8% of all employees who participated in the study (Table 1).

Physical, chemical, and psycho-physiological factors in workplace were measured and assessed according the order and methodologies of the Government of the Republic of Lithuania, Ministry of Health, Ministry of Social Security and Labor (4).

The research data were compiled in the “Microsoft Excel 97” program. Data sets and tables of frequencies provided in the questionnaires were calculated by means of “Epi info for Windows” statistical program. The Pearson’s criterion of compatibility of features $\chi^2$ and correlation connections was calculated in the “SPSS for Windows” program. The following meanings of compatibility of features criterion $\chi^2$ were observed when the level significant was $p=0.05$:

1. If $p<0.05$, then inter-dependence of features exists;
2. If $p>0.05$, then dependence of features does not exist;
3. If the number of cases of investigated feature is $<25\%$, then the meaning of $\chi^2$ criterion is assessed as statistically non-significant (18).
Results and discussion

According to the age of transport system employees, they were divided into 5 standard groups. Employees at the age 20–29 made 9.9%, at the age 30–39 made 28.1%, at the age 40–49 made 32.9%, at the age 50–59 made 24.9%, and 4.2% were older than 60 years. Thus, the absolute majority, i.e. 85.9% was made of young and average-age employees of the age 30–59. Among all, 85.4% were men, 14.6% were women. Of all the persons who participated in the study, 85.4% of drivers and 91.5% of electrical-mechanical specialists were men. Of all study participants, 6.6% had the background of primary education, 31.7% of participants had special secondary education, 46.0% had secondary education, 11.2% had higher education, and 4.4% had the background of high education. With regard to the years of employment, the grouping was as follows: 26.6% were working for up to 9 years, 30.4% – for 10–19 years, 23.8% – for 20–29 years, and 19.1% of all the employees were working for more than 30 years. Almost sixty percent (59.3%) of drivers were working for 10–29 years, 78.2% of employees were married, 12.1% were single, and the status of 9.7% was “other” (divorced or living with a partner).

Analysis of the lifestyle and psychological factors has indicated that only 3.8% of the employees were completely satisfied with the existing living conditions; 63.5% were satisfied, and their distribution by professions was almost the same, i.e. from 63.0 to 70.0%; 32.8% were not satisfied with their everyday living conditions. Those who were not satisfied with their living conditions regarded their health as “not quite well” or “ill” (p<0.05) (Fig. 2).

Over 46% of all the examined employees were smokers, while 54.0% were non-smokers. Treating this with regard to profession, drivers smoked the most, i.e. 47.9%, while auto-machinists made 53.1%. Smokers of other professions made 32.3–45.0%. It has been indicated that 60.7% of the employees smoked more often at work, while 39.3% – at home.

The alcohol users comprised 83.8%, while non-drinkers made 16.2%. Over 14.6% of the mechanics and 14.3% of auto-machinists used alcohol several times per week. Only 3.3–6.3% employees of other professions used alcohol drinks several times a week; 4.61% used alcohol once per month, while 44.5% used it several times per year. Although this study was anonymous, answers of the transport employees on the use of alcohol should be treated rather skeptically. These results were actually contradicting to the Lithuanian statistics of alcohol use.

Study of physical activity shows, that 46.3% of employees regard themselves as physically active. They exercise or do some other physical activity every day or several times a week. However, the bigger part of employees (53.7%) treats themselves as physically inactive. Drivers are the most physically active (47.2%), if compared with other occupations.

Analyzing nutrition issues of the employees, it has been observed that the absolute majority of the investigated persons (83.8%) ate 2–3 times per day, while 11.8% ate 4–5 times. About 3.8% of the interviewees ate once per day. Almost eighty three percent (82.5%) of them ate dry food with some beverages, while only 17.5% of the investigated had usual meal (with soup)
Nutrition of drivers and auto-machinists was the most irrational in this respect. Sixty eight percent (67.7%) of drivers, 50.0% of auto-machinists, and 55.5% of electricians-mechanics indicated that there are no suitable conditions at work for normal nutrition regime and for the required food ration (hot dishes, soup) because of the specific work schedules and poor menu at the acceptable public nutrition institutions.

Out of all the employees, 31.8% said that they did not have enough sleep: 43.3% of drivers, 29.3% of auto-machinists, and 27.3% of electricians-mechanics stated the lack of sleep. Over 20% of the interviewees felt drowsiness at work, 32.4% were in poor moods, and 26.2% of the workers felt frequent headaches. Statistical association between sleep duration, its quality, and the psycho-emotional status at work was high ($p<0.001$). About 16.2% of the respondents experienced mental stress every day, and over 21.5% experienced stress several times a week. Stressful situations each day were reported by 27.5% of drivers, 25.0% of machinists, and 10.2% of workshop workers (Table 2).

Almost 25% of drivers and auto-mechanics experience stressful situations several times a week. Indeed, insufficient sleep, headaches, and bad moods at work show a direct statistically significant association between these factors and stress experienced at work ($p<0.05–0.002$).

Analysis of working conditions and ergonomic factors has shown that 75.7% of the employees of the basic professions were satisfied with their working conditions, and 17.2% were not. The biggest number of the unsatisfied ones was among drivers – 20.3%, auto-mechanics – 22.2%, and electricians-mechanics – 17.4%. Microclimate of the working place (premises), air pollution, noise, vibration, tension, and long working hours are the most frequent factors, which cause negative assessment of the working conditions by the employees. However, subjective assessment of quality of the working conditions among different professions differs a lot. Drivers indicate that the most harmful factors to their health are tension of attention and sight, microclimate of the working place, exposure to chemicals (diesel fuel, cooling oils), noise and vibration and long working hours. Auto-mechanics regard microclimate, noise, and chemical pollution of air as the factors most hazardous to their health (Table 2).

The duration of working hours of many auto-transport employees (71.3%) is 8 hours on the average, while that of the rest (28.7%) is longer than 8 hours. Even 60.5% of drivers work more than 8 hours per day. It was observed that the working day longer than 8 hours was closely related with bad health ($p<0.05$) and stress experienced at work ($p<0.001$).

Having analyzed the subject opinion of 788 transport employees on assessment of their health during the last 12 months, it was received that “good health” was indicated by 69.9%, “not quite good health” – by 28.6%, “ill” – by 2.3% of respondents (Fig. 4). Drivers were assessing their health the most positively, i. e. 70.7%, and electricians mechanics, 66.0%. The poorest health was indicated by auto-mechanics (36.4%) and workshop employees (49.1%). During the last year, 39.0% of the transport employees visited a physician once, 51.0% – twice, and 10.0% – three and more times.

The research of auto-transport employees on the most frequent health complaints and symptoms was oriented towards the profession and possible expressions of professional impact factors. Central nervous system dysfunctions (headache, sleeplessness, sleepiness at work) were expressed by 32.7% of the employees. Hypertension was indicated by 19.6% of the workers. Respiratory problems and bronchitis were indicated by 22.7% of the respondents. A clear asso-

![Fig. 3. Lunch ration at work](image)
A comprehensive analysis of morbidity and sick leave was performed with 1827 employees of 3 companies, for the period 1999–2001. The morbidity factors, such as number of disease cases and number of unemployment days were calculated for 100 employees for the period of one year on the average. Figures of general morbidity of the employees of all transport companies during sick leave during indicated period comprised 97.3 cases and 1430.8 unemployment days for 100 employees on the average. Following the data of the Lithuanian Social Insurance Board (SODRA), for this period, 100 of the insured persons were related with 45.8 disease instances in 1999, 49.2 instances in 2000, 40.4 ones in 2001 (19). Thus, in the period 1999–2001, the figures of morbidity and sick leave of transport employees were 2 times higher than the morbidity figures of all the insured employees in Lithuania.

When making analysis of the morbidity of employees of all companies on the basis of the International Disease Classification (IDC-10), we have found that the highest position on the morbidity structure is taken by respiratory diseases, i.e. 24.0% cases and 244.7 unemployment days. The biggest part in this group is frequent among drivers; the result was statistically significant (p<0.002). This could be influenced by nutrition habits, dry food, smoking, and other factors typical to persons of these professions. Association of factors in the drivers’ profession and stress experienced daily at work (p<0.004) was statistically significant.

Analysis of the questionnaire data on “which symptoms of health disorders can be associated with the working conditions” enables us to make some presumptions concerning the working conditions. Seventeen percent of all the questioned workers as well as 26.7% of drivers suggested that “cold diseases”, common cold and bronchitis were to be related with the working conditions. Twenty percent of all the transport employees and 37.5% of drivers indicated that neck, back, and waist pain are related to the job task and poor work and ergonomic working conditions (p<0.02) (Fig. 5).

Headache and gastrointestinal disorders were more frequent among drivers; the result was statistically significant (p<0.002). This could be influenced by nutrition habits, dry food, smoking, and other factors typical to persons of these professions. Association of factors in the drivers’ profession and stress experienced daily at work (p<0.004) was statistically significant.

Table 3. Workplace conditions, which are the most unsatisfactory for the workers of main occupations

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Drivers</th>
<th>Auto locksmiths</th>
<th>Joiner’s shop workers</th>
<th>Electro mechanics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workplace conditions:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day shift</td>
<td>28.3</td>
<td>3.0</td>
<td>9.7</td>
<td>2.1</td>
</tr>
<tr>
<td>Evening shift</td>
<td>7.3</td>
<td>0.0</td>
<td>6.5</td>
<td>1.1</td>
</tr>
<tr>
<td>Night shift</td>
<td>10.5</td>
<td>1.0</td>
<td>8.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Long working hours</td>
<td>34.5</td>
<td>13.0</td>
<td>16.1</td>
<td>24.2</td>
</tr>
<tr>
<td>Monotonous work</td>
<td>22.1</td>
<td>8.0</td>
<td>12.9</td>
<td>1.1</td>
</tr>
<tr>
<td>Uncomfortable work place</td>
<td>18.3</td>
<td>11.0</td>
<td>9.7</td>
<td>12.6</td>
</tr>
<tr>
<td>Head strain</td>
<td>49.9</td>
<td>18.0</td>
<td>24.2</td>
<td>20.0</td>
</tr>
<tr>
<td>Visual intensity</td>
<td>49.1</td>
<td>16.0</td>
<td>22.6</td>
<td>9.5</td>
</tr>
<tr>
<td>Hearing intensity</td>
<td>13.7</td>
<td>9.0</td>
<td>3.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Noise</td>
<td>31.3</td>
<td>47.0</td>
<td>30.6</td>
<td>27.4</td>
</tr>
<tr>
<td>Vibration</td>
<td>45.8</td>
<td>18.0</td>
<td>21.0</td>
<td>7.4</td>
</tr>
<tr>
<td>Chemicals, fuels</td>
<td>46.6</td>
<td>45.0</td>
<td>29.0</td>
<td>28.4</td>
</tr>
<tr>
<td>Microclimate</td>
<td>47.2</td>
<td>60.0</td>
<td>53.2</td>
<td>41.1</td>
</tr>
</tbody>
</table>

Fig. 4. Self-evaluation of health of transport workers
made by sudden respiratory infections, flared up respiratory system diseases, pharyngitis, angina, and pneumonia. Influenza related to 5.5 cases and 49.6 unemployment days.

The second position in the structure of morbidity is taken by traumas and intoxications. Total trauma figures make 17.6 cases and 433.6 unemployment days. The biggest part in the traumatism structure is taken by every-day traumas and intoxications, i.e. 9.1 cases and 220.3 unemployment days, while general traumatism makes 7.2 cases and 164.5 unemployment days. Traumas experienced at work constitute only a small part of traumatism (0.7 cases and 30.7 unemployment days).

The third position in the morbidity structure is taken by the diseases of peripheral nervous system. Such figures indicate 10.9 cases and 100.1 unemployment days. Morbidity related to cardiovascular diseases comprised to 10.5 instances and 135.1 unemployment days. In this disease group, the biggest part was formed by ischemic heart disease and hypertonic disease. Morbidity with diseases of skeleton and muscle systems as well as the connective tissue construed 9.3 instances and 179.8 unemployment days. The figures of morbidity with gastrointestinal diseases were 5.6 cases and 90.8 unemployment days. Stomach and duodenum sores, gastritis, and duodenitis were prevailing.

Having compared morbidity of transport employees related to temporary unemployment with morbidity of employees of other branches, significant and statistically important differences were observed. For comparison of morbidity, morbidity figures of a large Lithuanian textile company (1040 employees) of 1999 were used (20). Comparative analysis of morbidity with the most frequent diseases have indicated that employees of the transport system were more frequently ill than the textile employees with the following diseases: respiratory diseases 1.7 times more often, diseases of peripheral nervous system 3.0 times more often, dermal diseases 3.5 times, cardiovascular diseases 4.2 times, diseases of digestion system 3.3 times, and traumas were experienced 5.3 times more frequently (p<0.05). Figures of unemployment days in relation to transport employees were also credibly (p<0.05) higher than in relation to the textile employees.

**Conclusions**

1. The lifestyle of the transport system employees was not healthy: 46.0% of them were smokers, 83.8% used alcohol, 52.8% were not sufficiently physically active, 31.8% lacked sleep, 82.5% had bad nutrition regime, 27.0% of drivers experienced stress situations at work daily.

2. Low temperature of premises, draughts, exposure to diesel fuel, cooling oils, noise, vibration, tension of attention as well as musculoskeletal systems were indicated by the employees as the factors most harmful to their health.

3. Thirty one percent of the auto-transport employees had complaints about their health. Functional complaints about musculoskeletal (46.2%), respiratory (22.7%), gastrointestinal (17.3%), and the central nervous system dysfunction (32.7%) were prevailing.

4. In the structure of morbidity of auto-transport employees, the first place was taken by respiratory diseases, followed by trauma and intoxication, peripheral nervous system diseases, cardiovascular diseases, and musculoskeletal disorders.
5. Musculoskeletal disorders of drivers and workshop workers were closely related to their profession (p<0.02–0.002), poor workplace ergonomic conditions, elder age, and long professional experience. Drivers and auto-mechanics suffered from respiratory and gastrointestinal diseases much more frequently (p<0.05–0.002), while gastrointestinal diseases were more typical to drivers.

Lietuvos autobusų ir troleibusų įmonių darbuotojų darbo sąlygos ir sveikata

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Raktažodžiai: transporto darbuotojai, darbo sąlygos, gyvensena, psichosocialiniai veiksmai, sveikata.

Santrauka. Trijose miesto autotransporto įmonėse, išplatinus anketas, atlikti 788 pagrindinių profesijų darbuotojų darbo sąlygas, gyvensenos, psichosocialinių veiksnių ir sveikatos tyrimai. Tarp profesinių veiksnių, žalingai veikiančių sveikatą, yra žema oro temperatūra, skersvėjai, kontaktas su dyzeliniu kuru, aušinimo skysčiai, triukšmas, vibracija, didelė skeletų ir raumenų sistemos bei dėmesio įtampa. Darbuotojų gyvensena nėra sveika: 46 proc. jų rūko, 83 proc. – vartoja alkoholinus gėrimus, 53 proc. – fiziškai neaktyvūs, 82 proc. – netinkamas mitybos režimas, 27 proc. – kasdien darbe patiria stresinių situacijų. Tarp pažeidimų vyrauja skeletų ir raumenų (46,2 proc.), kvėpavimo (22,2 proc.), virškinimo (17,3 proc.) bei centrinių nervų sistemų funkcinių (32,2 proc.) pažeidimai. Skeletų ir raumenų sistemos pažeidimai susiję (p<0,05–0,002) su netinkamomis ergonominėmis darbo sąlygomis, ilga darbo diena, vyresniu darbuotojų amžiumi bei dideliu profesinio darbo stažu.

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