

# A Model of Bus Drivers' Diseases: Risk Factors and Bus Accidents

G.H. Sadri

## Abstract

Bus accident is a major health problem for bus drivers. To identify the risk factors involved in bus accidents and to design a model showing the relation between the risk factors and bus driver's health status, 219 bus drivers who worked for travel agencies in two areas of west and central Iran were enrolled into this study. We used a questionnaire to gather information regarding both the bus drivers' health status and bus accident. The most prevalent health problems among bus drivers were musculoskeletal disorders, ulcer, hyperacidity, obesity, hypertension and diabetes. There was a significant ( $p < 0.05$ ) correlation between the chance of bus accidents and occurrence of low back pain, leg pain, neck pain, hypertension and migraine. Based on the results of this study we suggest a model that can be used to design a prevention plan in making bus transportation safer. In light of this study, more comprehensive studies can be planned for the safety of traveling by bus, in Iran. Bus driver's health status is a determinant factor in the incidence of accidents.

**Iran J Med Sci 2002; 27(1): 39-41**

**Keywords** • Health policy • accidents • accident prevention

**T**he knowledge of the epidemiology of accidents is important in institution of safety policy and with regard to the public health. Several factors such as the health status of individuals and human error play a role in the occurrence of accidents.<sup>1</sup> Human error itself is affected by internal or external factors like illness and other health problems.<sup>2</sup> Professional drivers had a higher percentage of serious injuries and severe permanent impairments as compared to other occupational groups.<sup>3-5</sup> According to a study, 13.5% of fatalities in road accidents in Hamedan were drivers.<sup>6</sup> This issue becomes more important when some studies suggest that transportation in Iran is already dangerous.<sup>7</sup> The condition of roads, vehicles and most particularly of the drivers, all conspire to make transport potentially risky to passengers. Bus accident is a major health problem for bus drivers, therefore, an epidemiological survey might be helpful for accident prevention.<sup>8</sup>

To determine the bus drivers' health problems and their relationship to the frequency of bus accidents, 219 bus drivers randomly selected from travel agencies in two cities of western (Hamedan) and central (Yazd) Iran were enrolled into this study. They worked in different work shifts.

Due to their low level of physical activity of the bus drivers in our study group, we selected 219 controls from office workers. A questionnaire was used to determine the status in both groups. We

Department of Epidemiology and Biostatistics, School of Health, Hamadan University of Medical Sciences, Hamadan, Iran

**Correspondence:** GH. Sadri, Ph.D.,  
**Tel:** +98-811-8255963,  
**Fax:** +98-811-8255964,  
**E-mail:** [ghsadri2000@yahoo.com](mailto:ghsadri2000@yahoo.com)

**Table 1:** The frequency of some disease conditions amongst study and control groups

Parameter	Bus Accidents		p-value
	Study group (%)	Control group (%)	
Low back trouble	60 (57)	46 (41)	0.015
Back pain	56 (53)	25 (22)	0.000
Neck pain	29 (28)	6 (5)	0.000
Leg pain	40 (38)	20 (18)	0.000
Hypertension	12 (25)	2 (1.8)	0.003
Ulcer and Hyperacidity	26 (25)	18 (16)	0.104
Obesity	11 (10)	16 (14)	0.409
Migraine	18 (17)	2 (2)	0.000
Diabetes	6 (6)	2 (2)	0.121

at their offices. Data were analyzed using  $\chi^2$  test.

A comparison of recorded disorders showed that the occurrence of low-back-related problems, back pain, neck pain, hypertension, ulcer and hyperacidity, obesity, migraine and diabetes was significantly ( $p < 0.05$ ) higher in bus drivers than the control group. More than half of the bus drivers were involved in a major accident; 38.6% were involved for 1-2 times, 6.5% for 3-4 and, 2.3% for >4 times in bus accidents.

The mean number of bus accidents for each bus driver was 0.95 times. Most of the aforementioned problems had a significant correlation with the frequency of bus accident (Table 1).

The factors attributing to bus drivers' disorders were number of driving hours, roughness of the road, driver seat position, position of the gear, job dissatisfaction, length of driving, body mass index (BMI), nervousness, depression, eating nuts and chocolate

interviewed the subjects at bus terminals and the controls

whilst driving, lack of exercise, history of family disorder and age.

There is a clear correlation between some conditions such as low back pain, back pain, neck pain, hypertension and migraine, and involvement in bus accidents. The results also demonstrate that diabetes, ulcer, hyperacidity and obesity are major risk factors. However, no association was found between above-mentioned disorders and the frequency of bus accidents.

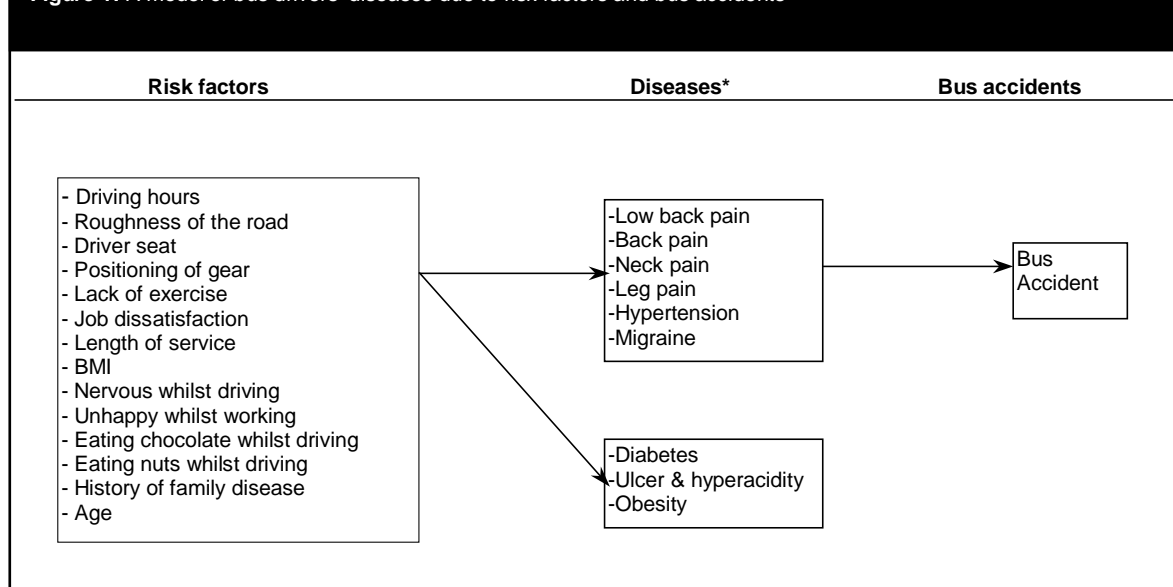
Our findings are mostly similar to those reported from other countries. Backman in Finland, using a cross-sectional study, suggested an increased frequency of shoulder and back pain in professional drivers especially in bus drivers.<sup>9</sup> Netteeson in a study in Denmark reported that low back problem was more prevalent among bus drivers.<sup>10</sup> Patterson, *et al.* also found that the most prevalent health problems in bus drivers are musculoskeletal disorders.<sup>11</sup> Some other studies also indicated that low back pain incapacitated many of bus drivers and might be a major source of bus accidents.<sup>7,12</sup>

According to the results obtained from this study, a model was designed, showing relationship between the disorders, risk factors, and bus accidents (Fig.1). This model can be used to outline prevention plans for bus accidents in the area. Finally, more comprehensive studies are needed for the safety of human transportation by bus, in Iran.

## References

- 1 Kazantzis G, McDonald JC: Work, health and

**Figure 1:** A model of bus drivers' diseases due to risk factors and bus accidents



- disease. In: Karvonen M, Mikheev MI, eds. *Epidemiology of Occupational Health*. Geneva, WHO Regional Publications, European series 1986;**20**:49.
- 2 Basch PF: *Textbook of International Health*: New York, Oxford University Press,**1990**:238.
- 3 Vetter N, Mathews L: *Epidemiology and Public Health Medicine*. London: Harcourt Publishing Ltd., **1999**:123-8.
- 4 Bylund P, Bjornstig U, Lasso TJ: Occupational road trauma and permanent medical impairment. *Safety Science* 1997; 26(3):187-200.
- 5 Morris JN, Heady JA, Raffle P, et al: Coronary heart disease and physical activity of work: *Lancet*. 1953;**2**:1053-7.
- 6 Mohammadfam E, Sadri GH: An epidemiological survey of road accident led to death in Hamadan area, Iran, 1999-2000. *J legal med org of IR Im* 2000; **20**: 5-11. (In Persian)
- 7 Sadri GH: An epidemiological of health problem in the occupational community of bus drivers in the Islamic Republic of Iran. Ph.D. Thesis. U.K: University of Wales (UK). **1993**:133-71 & 218-62.
- 8 Saari J. "Accident epidemiology". In: karvonen M, Mikheev MI: *Epidemiology of Occupational Health*. WHO. Regional Publications, European series, 1986;**20**:299-300.
- 9 Backman A: Health survey of professional. *Scand J Work Environ. Health* 1983; **P**:32.
- 10 Netterstrom B, Juel K: Low back trouble among urban bus drivers in Denmark. *Scand J Soc Med* 1989;**17**:203-6.
- 11 Patterson PK, Eubanks TL, Ramseyer R: Back discomfort prevalence: *AAOHN J* 1986;**34**:483.
- 12 Chaffin DB. Human strength capability and low back pain. *J Occupational Med* 1974;**16**:248.