# The Effect of Working Conditions to the Health Status in Taxi and Bus Drivers in Çanakkale, Turkey; Community Based Study

# Taksi ve Otobüs Şoförlerinin Çalışma Koşullarının Sağlık Durumlarına Etkisi, Çanakkale; Toplum Tabanlı Çalışma

Şoförlerin Çalışma Koşullarının Sağlık Durumlarına Etkisi / Working Conditions to the Health Status in Drivers

Ayşegül Uludağ[1], Sibel Cevizci[2], Murat Tekin[1], Yusuf Haydar Ertekin[1], Sezgin Sevim[2], Ülken Babaoğlu[3], Coşkun Bakar[2]
[1]Department of Family Medicine, Canakkale Onsekiz Mart University, Canakkale,
[2]Department of Public Health, Canakkale Onsekiz Mart University, Canakkale,
[3]Health College, Ahi Evran University, Kırşehir, Turkey

**Özet**

Amaç: Taksi ve otobüs şoförlerinin artan iş yükü kötü sağlık durumuna, obezite, hipertansiyon, metabolik sendrom ile birlikte artan kardiyovasküler hastalık riskine neden olmaktadır. Bu çalışmada taksi ve otobüs şoförlerinde çalışma koşulları ile sağlık durumlarının arasındaki ilişkinin belirlenmesi amaçlanmıştır. Gereç ve Yöntem: Bu çalışma tanımlayıcı bir çalışmadır. Çalışmanın evrenini Çanakkale il merkezindeki taksi ve otobüs şoförleri oluşturdu. Çanakkale Şoförler ve Otomobilciler Esnaf Odasına bağlı toplam 250 taksi ve otobüs şoförü bulunmaktaydı. Çalışmada 70 taksi şoförü ve 93 otobüs şoförüne ulaşıldı. Katılımcılar çalıştıkları yerde ziyaret edildi. Sosyo-demografik özellikleri, alışkanlıkları ve çalışma koşullarını sorgulayan anket uygulandı. Kan basıncı, bel-kalça ölçümleri ve herhangi bir zamanda kapiller kan şekerlerine bakıldı. Bulgular: Toplam 163 erkek çalışmaya alındı. Dokuz (%12,9) taksi şoförü ve 6 (%6,5) otobüs şoförü hipertansifti ve 1 taksi şoförü ve 2 otobüs şoförünün random kapiller glukoz seviyesi 200 mg/dl. den yüksekti. Hipertansiyonun prevalansı %9,2, diabetes mellitusun %1,8 ve obezitenin %49,4'dü. Tartışma: Şoförler stres ve immobil olmak gibi birçok KVH riskine sahiptirler. Çalışmamızda Çanakkale'de şoförlerin sosyo-demografik ve çalışma koşulları hipertansiyon, diabetes mellitus ve obezite oluşumundaki risk faktörlerini açıklamakta sınırlı kalmıştır. Çalışma büyükşehirlerde yapılmalıdır. Bu açıdan şoförler kendi yerleşim yerleri ve çalışma koşullarında değerlendirilmelidir.

**Anahtar Kelimeler**

Şoförler; Çalışma Koşulları; Sağlık Durumları

**Abstract**

Aim: The growing taxi and bus driver workforce is at risk for poor health status, obesity, hypertension, metabolic syndrome and with increased risk for cardiovascular disease. We aimed to determine the relationship between working conditions and health status in taxi and bus drivers. Material and Method: This study is a descriptive study. The population of the study was taxi and bus drivers in central of Çanakkale. There were total 250 taxi and bus drivers who registered in The Chamber of Çanakkale Drivers and Vehicle. We reached the 70 taxi drivers and 93 bus drivers. The participants were visited at their workplace. We performed the questionnaire that include the socio-demografic features, habits, the working conditions. We evaluated the blood pressure, waist-hip measurements and capillary blood glucose at any time. Results: Total of the 163 men drivers were enrolled the study. Nine (12.9%) taxi drivers and 6 (6.5%) bus drivers were hipertensive, and 1 taxi driver and 2 bus drivers with random capillary blood glucose levels higher than 200 mg. The prevalence of hypertension was 9.2%, diabetes mellitus was 1.8, obesity was 49.4%. Discussion: Drivers have many risk factors for CVD like stress and immobility. In our study, the socio-demografic and working conditions are limited for explaining the risk for hipertension, diabetes mellitus and obesity in drivers in Çanakkale. These study have to be done in metropolitan cities. In this aspect, the drivers can be evaluated in their own living spaces and working conditions.

**Keywords**

Drivers; Working Conditions; Health Status

DOI: 10.4328/JCAM.3796 Received: 28.07.2015 Accepted: 10.08.2015 Printed: 01.12.2015 J Clin Anal Med 2015;6(suppl 6): 835-8
Corresponding Author: Ayşegül Uludağ, Department of Family Medicine, Canakkale Onsekiz Mart University, Faculty of Medicine, Canakkale, Turkey.
T.: +90 2862635950/2314 GSM: +905337305535 F.: +90 2862635957

**Introduction**

Recently, death from cardiovascular disease is in the first place in the world. The policy makers maintained the reduction of cardiovasculary risk in the population as a strategy of the health management. The American Heart Academi (AHA) as set an ambitious national goal to achieve by the year 2020: to improve the cardiovascular health of all Americans by 20%, while reducing deaths from CVD and stroke by 20% [1]. This goal is aimed both primary and secondary prevention from the cardiovasculary death. Hyperlipidemia, increasing blood pressure, smoking, unhealthy diet and sedantary lifestyle are the changeable of cardiovasculary disease.

Taxi and bus drivers labor burden is increasing with growing population in the world. Working condition are different and defined as increased risk for CVDs. The drivers have irregular working conditions. The severity of work is so different even during the day. Their job is stressfull and working time is usually unclear. Hours of sleep, varying meal times due to working shifts and with constantly living and traffic related obligations are some of the reasons for the CVDs. On the other hand, these conditions are also the risk factors of hipertension, diabetes mellitus and metabolic syndrome and also CVDs [2,3]. Drivers are considered to be involved risk for myocardial infarction in Europe last 60 years. Bigert et al. [4] found the myocaridal infarction risk increased 1.66 in truck drivers, among taxi drivers 1.88 and in bus drivers was 2.14. This risk was related with the duration of work and social factors. The environment factors were defined as the other related factors for myocardial infarction.

We aimed to determine the effect of working conditions to health status in taxi and bus drivers.

Material and Methods: This study is a descriptive study. The population of the study was taxi and bus drivers in central of Çanakkale. There were total of the 250 drivers who registered in The Chamber of Çanakkale Drivers and Vehicle in March 2015. We calculate the sample size 152 drivers with confidence level 95% and confidence interval 5%. We reached the 70 taxi drivers and 93 bus drivers in the study.

The drivers were visited at their workplace. We performed the questionnaire that includes the socio-demografic features, habits, the working conditions. We evaluated the blood pressure in both arms, waist-hip measurements and capillary blood glucose at any time.

*Measurements*

Questionnaire: The questionnaire form was included, the socio-demographic (age, gender, marital status, education, income level, having any chronic disease), habits (smoking, alcohol), working conditions variables (data about driven car, duration time as driver, hour of driving, kilometers, sleeping time).

Anthropometric Measurements: The anthropometric measurement of driver's weight was measured standing with shoes off using a Standing Height Meter. Weight measurements used a calibrated digital scale. The digital scale with sensitivity 0.01 kg was placed on the floor during measurements and drivers removed shoes and any other weight, and stood with weight equally distributed on both feet. Waist and hip circumference measurements were taken with a non-elastic measuring tape. Waist circumference measurement was taken with a measuring tape midway between the lower rib and the iliac bone on the right with stomach free. Hip measurement was taken with standing straight at the highest point of the hip with a measuring tape. Measurements were completed with sensitivity of 0.01 cm.

Blood Pressure: Blood pressure of the drivers was measured both arms according to the guideline of Turkish Society of Cardiology. The mean of the blood pressure was taken for evaluation.

Capillary Blood Glucose Level: We used the capillary blood glucose strip.

Permissions and Consent: This study received permission from the Çanakkale Onsekiz Mart University Ethics Committee. The researchers get both orally and written permission from the drivers.

Statistics: We used the descriptive tests for the socio-demografic variables. Kolmogorov–Smirnov test revealed that not all variables were normally distributed. We used the Mann Whitney-u Test for non-parametric variables. We therefore used Kendall tau_b correlation coefficients (rho) for assessing the correlation between the health conditions parameters and working conditions. We examined the relation between the socio-demografic, working condition variables with the measurements in Multivariable Linear Regression Backward Model. $p<0.05$ is statistically significant.

**Results**

There were 70 taxi drivers and 93 bus drivers. The mean age of the taxi drivers was 41.2±11.7 [24-68] and bus drivers 42.4±9.6 [24-61] years. The mean of the working year as bus driver was 17.8± 8.9 year [2-42] and 16.5±10.4 [2-43] year as taxi driver. Socio-demographic features and working conditions of drivers are given in Table 1.

Of the 70 taxi drivers 55.6% and 27.5% of bus drivers had 2 days off. Of the 70 taxi drivers 54.3% work only during day, 10.0% work only nights, 25.7% work day and night. Of the 93 bus drivers 39.9% work during day, 5.4% work only nights, 54.7% work day and night.

Nine (12.9%) taxi drivers and 6 (6.5%) bus drivers were hipertensive. There was no statistical significant between them ( chi-square2 =1.961;p=0.161). There were 1 taxi driver and 2 bus driver with random capillary blood glucose levels higher than 200 mg. In this study, based on the ATP III criteria, the prevalence of Metabolic Syndrom was found 9.6%. Of the 8 (11.4%) taxi drivers and 8 (8.6%) bus drivers were met the criteria of ATP III (chi-square2 =0.360;p=0.548). Fifty one drivers were (31.5%) overweight and 80 (49.4%) drivers were obese. There was only statistical significant relationship between smoking and DM (chi-square2 =10.762;p=0.005). Diabetics were much current smoker. There was no significant relation between alcohol consumption and the other factors.

Metabolic Syndrome and working hours was statistical significant (u=750; p=0.015). MetS patients had 11,0±1.3 hours/day with higher working hours. There was statistical significant between obesity and age (u=2720;p=0.028). Mean age of the obese drivers was 43.6±10.6 years with higher than non-obese. In study, there was no statistical relation with blood pressure, socio-demografic and working condition variables. Capillary blood glucose levels and weight were relation with kilometers

Table 1. Socio-Demografic Features and Working Conditions of Drivers

| | Taxi Drivers mean±SD | Bus Drivers mean±SD | Statistical test | p |
|---|---|---|---|---|
| Age | 41.2±11.7 [24-68] | 42.4±9.6 [24-61] | chi-square2= 64.284 | <0.05 |
| Education | | | | |
| Primary school | 23(32.9%) | 65(69.9%) | chi-square2= 23,762 | <0.05 |
| High school | 34 (48.6%) | 24 (25.8%) | | |
| University | 13(18.6%) | 4(4.3%) | | |
| Marital status | | | | |
| Single | 19 (27.2%) | 20 (21.5%) | u=3139.5 | >0.05 |
| Married | 51 (72.8%) | 73 (78.5%) | | |
| Smoking | | | | |
| smoking | 30 (42.9%) | 63 (67.7%) | chi-square2= 10,170 | <0.05 |
| Non-smoking | 40 (47.1%) | 30 (33.3%) | | |
| Alcohol | | | | |
| Yes | 47(67.1%) | 64(68.8%) | chi-square2= 2.247 | <0.05 |
| No | 23(32.9%) | 29(31.2%) | | |
| Driver year | 16.5±10.4 [2-43] | 17.8±8.9 [2-42] | chi-square2= 34.266 | >0.05 |
| History of Chronic Disease | 32 (45.7%) | 35 (37.6%) | chi-square2= 1.077 | >0.05 |
| Hour of working as driver (hour/day) | 10.5±2.5 [3-15] | 9.1±2.5 [2-15] | chi-square2= 27,547 | <0.05 |
| Hour of driving | 5.8 ±2.9 [1-12] | 6.8±2.8 [1-14] | chi-square2= 107,162 | <0.05 |
| Kilometers (km/day) | 64.7±33.3 [10-200] | 186.0 ±117,5 [10-1000] | chi-square2= 24,197 | <0.05 |
| Sleeping hours/day | 6.7±1.6 [4-12] | 7.5±1.5 [4-12] | t=-3.022 | <0.05 |
| Sistolic Blood Pressure (mmHg.) | 135.3±14.5 [100-182] | 128.8±11.7 [101-159] | t=3.176 | <0.05 |
| Diastolic Blood Pressure (mmHg.) | 80.2±10.9 [55-110] | 78.9±8.7 [53-100] | t=0.836 | >0.05 |
| Waist circumference (cm) | 102.5±11.6 [76-143] | 104.4±12.8 [75-142] | t=-0.964 | >0.05 |
| Capillary Blood Glucose (mg/dl) | 117.7±27.8 [75-205] | 123.1±38.8[70-409] | t=-0.993 | >0.05 |

chi-square2 ; chi-square test, t; independent t test, u; Mann Whitney u test

driven in day. The relation with variables are shown in Table 2. In the multivariable Linear Regression Backward Model, we examined the relation between the socio-demografic, working condition variables with the measurements. According to this model; the sistolic, diastolic blood pressure, weight, waist circumference were not significant relation with the variables written above. But the capillary blood glucose level was relation with the the age, being married and driven old car. The relation of them were shown in Table 3.

Table 2. The relationship with socio-demographic and measuring variables

| Blood glucose level | r* | p |
|---|---|---|
| Waist circumference | 0.151 | 0.005 |
| Weight | 0.137 | 0.011 |
| Waist circumference (cm) | | |
| Blood glucose level | 0.151 | 0.005 |
| Weight | 0.444 | 0.000 |
| Kilometers (km/day) | 0.122 | 0.029 |

*Kendall tau-b correlation p<0,05

## Discussion

In this study, we determined the effect of working conditions to health status in taxi and bus drivers. The prevelance of DM, MetS and HT in drivers was lower than population, overweight and obesity prevalence was higher, 31.5% and 49.4% respectively. MetS patients had 11.0±1.3 hours/day with higher working hours. Increased capillary blood glucose levels depended to age, being maried and driven old car. In our study, the socio-demografic and working conditions are limited for explaining the risk for hipertension, diabetes mellitus, MetS and also the cardiovascular disease risk in drivers.

Hypertension is one of the most important risk factors for stroke, coronary heart disease, and renal disease and be considered that will effect the 29.2% of whole population in the world [5-7]. The prevalence rates of hypertension and diabetes mellitus in drivers was 18.2% and 8.8% in China; and 42.9% and 7.7% in Iran [8,9], respectively. The mostly age of drivers was 30-50 in China and 36.6 ± 10.7 (21-73) years in Iran. In Turkey, 11% in men and 16% in women is hypertensive between the 20-61 years old [10]. In our study, the mean age of the drivers was 41.2±11.7 [24-68], the prevalance of hypertension was 9.2% and diabetes mellitus was 1.8%. In Çanakkale, the prevelance of hipertension and DM is lower in drivers than the other countries. The drivers experience may decrease physical activity, hard work, job stress, and a disruption in normal sleep and waking patterns, which might explain the higher prevalence of hypertension and DM. These factors are varying in each country and cities. Working conditions are affected by the population of the city. In Çanakkale the population of the center of study is 120.000. In our detailed analyzing, none of the variables that specified did not effect the hypertension and DM in study.

Table 3. The relation between the capillary blood glucose level in the Multivariable Linear Regression Backward Model

| | Blood Glucose Level | | | |
|---|---|---|---|---|
| | β | p* | Lower Bound | Upper Bound |
| Constant | -89,032 | .129 | -206,283 | 28.220 |
| Age | 2,899 | .008 | 0,892 | 4.966 |
| Marital status | 24,624 | .011 | -6.197 | 43,051 |
| 1=single | | | | |
| 2=married | | | | |
| Duration as driver (year) | 0,014 | .080 | -0.002 | 0.029 |
| Driven old car | 19,364 | .035 | -1.548 | 37,180 |
| 1=yes | | | | |
| 2=no | | | | |
| Driver | -15,413 | .213 | -40.399 | 9.593 |
| 1=Taxi driver | | | | |
| 2=Bus driver | | | | |

adjusted r2=0.443
*p<0.05 is significant

The drivers have sedantary life style all day. The physical activity is limited. In Italy, 61% of the truck drivers were obese and overweight. The researchers declared that the traveling more than 40,000 miles per year and hours spent behind the wheel per day increase the risk of obesity [11]. In Poland; 45.3% had overweight and 17.4% were diagnosed with obesity and in Saudi Arabia 73.2% of the drivers were obese [12,13]. In Turkey; obesity prevelance is 20.6% and overweight was 41.5% in males [14]. Obesity is increased the cardiovasculary risk. In our study, the prevelance of obesity and overweight were 31.5% and 49.4% respectively. They did not related with any social or work related factors in our study. The working conditions, sedantary lifestyle and diet features effect the obesity and overweight.

Metabolic Syndrome have a risk factor for about 25% of the new cases of cardiovascular diseases [14]. Cavagioni et al. [15] declared that the MetS prevelance in drivers was 24% and it correlates with the Framingam Risk Score in Portugal. In Turkey, the MetS prevalence is 10.7% in 20-29 years old, 23.9% in 30-39 years old, 36.7% in 40-49 years old, 41.1% in 50-59 years old and in total prevelance is 33.9% in males [16]. In our study, the prevelance of MetS was 9.6% with lower than the general population. In this study, we can not evaluate the driver according the all ATP III criterias. We could examine only the waist circumference, blood pressure and random blood glucose levels. The other criterias including trigliserid and HDL-C levels could not able to evaluate for diagnosing MetS. One of the diagnostic criteria of the MetS is capillary blood glucose levels. Capillary blood glucose was increasing with age, being married and driven old car. So many older drivers were married in this study. Older drivers had increasing blood glucose. Usage old car is stressfull event because of crashing.

In Sweden, job strain, smoking, overweight and low phsical activity was higher in drivers than the general population [4]. There had been developed many instruments for measuring the drivers stress. One of them is occupational stress. Occupational stress is defined as ongoing stress that is related to the work and workplace. In Serbia, total elevated occupational stress risk was related with hipertension, and dislipidemia [17,18].

There had been done many studies for increasing the awareness about cardiyovasculary disease. Giving education to the drivers about cardiyovasculary disease had been found effectively [19,20].

### *Conclusion*

Drivers have many risk factors for CVD like stress and immobility. In our study, the socio-demografic and working conditions are limited for explaining the risk for hipertension, diabetes mellitus and obesity in drivers in Çanakkale. These study have to be done in metropolitan cities. In this aspect, the drivers can be evaluated in their own living spaces and working conditions.

### *Limitations*

#### *Limitations of the study;*

-This study is descriptive study and data collected in the area. So we could not able to get the laboratuary test including lipids and we could not able to evaluate all of the cardiovasculary risk, eg. measurements of LDL, HDL, Trigliserid, fasting blood glucose.

-There are many tools for evaluating the cardiovasculary risk like Framingam risk score. But in our study we could not use these assesment tools for not providing financial support.

-In Çanakkale all of the drivers were male so we could not able to enroll the female drivers in study.

### *Competing interests*

The authors declare that they have no competing interests.

**References**

1. Lloyd-Jones DM, Hong Y, Labarthe D, Mozaffarian D, Appel LJ, Van Horn L, et al. Defining and setting national goals for cardiovascular health promotion and disease reduction: the American Heart Association's strategic Impact Goal through 2020 and beyond. Circulation 2010;121(4):586–613.
2. Belkic K, Emdad R, Theorell T. Occupational profile and cardiac risk: possible mechanisms and implications for professional drivers. Int J Occup Med Environ Health 1998;11(1):37–57.
3. Tüchsen F, Endahl LA. Increasing inequality in ischaemic heart disease morbidity among employed men in Denmark 1981–1993: the need for a new preventive policy. Int J Epidemiol 1999;28(4):640–4.
4. Bigert C, Gustavsson P, Hallqvist J, Hogstedt C, Lewné M, Plato N, et al. Myocardial infarction among professional drivers. Epidemiology 2003(3);14:333-9.
5. Whitworth JA; World Health Organization ISOHWG. 2003 World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension. J Hypertens 2003;21(11):1983–92.
6. Prospective Studies Collobration, Lewington S, Whitlock G, Clarke R, Sherliker P, Emberson J, et al. Blood cholesterol and vascular mortality by age, sex, and blood pressure: a meta-analysis of individual data from 61 prospective studies with 55,000 vascular deaths. Lancet 2007;370(9602):1829–39.
7. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. Lancet 2005;365(9455):217–23.
8. Yang Y, Fan XS, Tian CH, Zhang W, Li J, Li SQ. Health status, intention to seek health examination, and participation in health education among taxi drivers in Jinan, China. Iran Red Crescent Med J 2014;16(4):50-5.
9. Saberi HR, Moravveji AR, Fakharian E, Kashani MM, Dehdashti AR. Prevalence of metabolic syndrome in bus and truck drivers in Kashan, Iran. Diabetol Metab Syndr 2011 19;3(1):8-11.
10. Onat A, Şenocak M, Örnek E, Gözükara Y, Avcı GŞ, Karaaslan Y, et al. Türkiye'de Erişkinlerde Kalp Hastalığı ve Risk Faktörleri Taraması: 5. Hipertansiyon ve Sigara İçimi. Türk Kardiyol Dern Arş 1991;19(1):169-77.
11. Rosso GL, Perotto M, Feola M, Bruno G, Caramella M, Djindjić N, et al. Investigating obesity among professional drivers: the high risk professional driver study. Am J Ind Med 2015;58(2):212-9.
12. Marcinkiewicz A, Szosland D. Selected risk factors of diabetes mellitus among road transport drivers. Int J Occup Med Environ Health 2010;23(2):175-80.
13. Shakhatreh FM, Abclul-boqi Kj. Obesity in drivers. Saudi med j 2000;21(1):58–60.
14. İslamoğlu Y, Koplay M, Sunay S, Açıkel M. Obezite ve metabolik sendrom. Tıp Araştırmaları Dergisi 2008;6(3):168-174.
15. Cavagioni LC, Bensenõr IM, Halpern A, Pierin AM. Metabolic Syndrome in professional truck drivers who work on Highway BR-116 within the area of São Paulo City - Régis Bittencourt. Arq Bras Endocrinol Metabol 2008;52(6):1015-23.
16. Grundy SM, Brewer HB, Cleeman JI, Smith SC Jr, Lenfant C: National Heart and Blood Institute, American Heart Association. Definition of metabolic syndrome: report of the National Heart, Lung and Blood Institute/ American Heart Association conference on scientific issues related to definition. Circulation 2004;109(2):433-8.
17. Djindjić B, Jovanović M, Pesić M, Jovanović JJ. Work stress related lipid disorders and arterial hypertension in professional drivers-a cross-sectional study. Vojnosanit Pregl 2013;70(6):561-8.
18. Jovanović J, Stefanović V, Stanković DN, Bogdanović D, Kocić B, Jovanović M, et al. Serum lipids and glucose disturbances at professional drivers exposed to occupational stressors. Cent Eur J Public Health 2008;16(2):54-8.
19. Doyle J, Severance-Fonte T, Morandi-Matricaria E, Wogen J, Frech-Tamas F. Improved blood pressure control among school bus drivers with hypertension. Popul Health Manag 2010;13(2):97-103.
20. Hwang GS, Choi JW, Choi SH, Lee SG, Kim KH, Cho YM, et al. Effects of a tailored health promotion program to reduce cardiovascular disease risk factors among middle-aged and advanced-age bus drivers. Asia Pac J Public Health 2012;24(1):117-27.

How to cite this article:
Uludağ A, Cevizci S, Tekin M, Ertekin Y.H, Sevim S, Babaoğlu Ü, Bakar C. The Effect of Working Conditions to the Health Status in Taxi and Bus Drivers in Çanakkale, Turkey; Community Based Study. J Clin Anal Med 2015;6(suppl 6): 835-8.