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Prevalence of Cardiovascular Risk Factors among Taxi Drivers in Yazd, Iran, 2016

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ABSTRACT

Introduction: Cardiovascular diseases are the first cause of death in the world. Taxi drivers are a high risk group for developing cardiovascular diseases, due to exposure to unhealthy working conditions. The aim of this study was to assess the prevalence of cardiovascular risk factors among taxi drivers.

Methods: This cross-sectional study was conducted in 2016 on 110 taxi drivers that were selected by a simple random sampling method. Prevalence of dyslipidemia, obesity, smoking, hypertension and diabetes were estimated. Descriptive statistics and the extended Fisher exact test were used for data analysis.

Results: In this study, all participants were male, with mean age and experience of 46.4±11.6 and 11.3±8.8 years, respectively. Among all subjects, 89.1% had at least one risk factor, 30% two risk factors, 22.7% three risk factors, 14.5% four risk factors, and 4.5% five risk factors. This study showed that prevalence of hypertension, diabetes, dyslipidemia and smoking among subjects were 35.5, 10, 66.4 and 12.7, respectively. Also 45.45% and 25.45 % of individuals were overweight and obese, respectively.

Conclusion: The results of this study showed a high prevalence of cardiovascular risk factors (especially low HDL-C) among taxi drivers.However, training courses for lifestyle modification can potentially be effective in preventing the occurrence of cardiovascular diseases in these people.

Keywords*:* Taxi drivers, Risk factors, Cardiovascular disease

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Introduction

Cardiovascular disease (CVD) is one of the most frequent and important non-communicable diseases in the world [1], which accounts for 30% of the world's deaths [2]. According to studies conducted in this regard, about 14 million people died due to heart diseases in 1990; this rate is predicted to reach up to 25 million by 2020 [3]. Several risk factors have been identified for heart diseases, which are categorized into two groups of non-modifiable and modifiable. Non-modifiable factors include age, gender, race, and family history, while modifiable risk factors consist of lipid profile disorders, hypertension, type 2 diabetes, smoking, obesity, inadequate physical activity, regular alcohol consumption, and inappropriate diet [4, 5].

Many researchers have reported a higher prevalence of CVD among drivers compared to other jobs, such as employees and industrial workers [6, 7]. Moreover, in many epidemiological studies, there was a significant relationship between taxi driving and heart disease [8, 9]. Taxi drivers are exposed to unhealthy working conditions, for example, long hours of work, irregular work shifts, sleep disturbances, inadequate physical activity, stressful conditions, and exposure to air pollution. These factors are the main causes of obesity, type 2 diabetes, and hypertension [6, 9, 10]. Therefore, identification of the risk factors in these individuals is very important for the prevention of cardiovascular diseases [11].

Several studies have been conducted on the prevalence of cardiovascular risk factors in drivers. For instance, Hirata et al. reported that the prevalence of HDL< 40 mg/dl was18%, the prevalence of triglycerides >150 mg/dl was 34.4 %, the prevalence of FBS >100 mg/dl was 39.1%, total cholesterol>240 mg/dl was 10.7%, and the prevalence of LDL >160 mg/dl was 7.1% [5]. Furthermore, Kazemi et al. reported a high prevalence of cardiovascular risk factors, especially lipid disorders, obesity, smoking, and hypertension in heavy vehicle drivers [12].

Accordingly, investigating the prevalence of cardiovascular risk factors among different groups of society, including high risk groups is one of the initial and essential measures for the health system of all countries. Considering that drivers are at high risk of developing this disease, this study was conducted to determine the prevalence of risk factors for cardiovascular diseases among taxi drivers in Yazd.

Methods

Study design

This cross-sectional study was conducted among 110 taxi drivers in the year 2016 in Yazd. Sampling was done by a simple random sampling method. The statistical population of this research consisted of all male taxi drivers of Yazd, whose names were taken from the city's Taxi Union. Then, the names were coded and 110 numbers were randomly selected. The number of samples required for the study was calculated by considering p = 0.22 of similar studies and d = 0.07 using the sample size formula for estimating the proportion. Exclusion criteria included having a second job and an employment record of less than one year as a taxi driver

Ethical considerations

This study was approved by the Ethics Committee of Yazd Shahid Sadoughi University of Medical Sciences in 2016. All the research steps were described in detail for the participants and they were asked to complete the informed consent forms.

Data collection

Demographic characteristics of these drivers (age, gender, level of education) as well as work experience and smoking status were recorded. Based on the criteria set by the National Heart Foundation of Australia, systolic blood pressure (SBP) of less than 120 mmHg and diastolic blood pressure (DBP) of less than 80 mmHg were considered as optimal. SBP in the range of 120-129 and/or DBP of 80-84 mmHg were also normal. Individuals with SBP of 130-139 and/or DBP of 85-89 mmHg were considered as high normal. Finally, SBP of 140 mmHg or above and/or DBP of 90 mmHg or more were referred to as hypertension [13]. According to the WHO recommendation, people with the body mass index (BMI) in the range of 18.5- 24.9 kg/m^2 normal, from 25 to 29.9 kg/m^2 are

overweight, and those with BMI of more than 30 kg/m^{2}are obese [14]. Based on Adult Treatment Panel III (ATP III) criteria, the waist circumference of more than 102 centimeter in men is considered as a measure of abdominal obesity [15].

Blood samples were taken from all participants after 8-12 hours of fasting. Blood glucose and lipids were measured using an auto-analyzer (Alpha Classic, made in Iran) by Pars Azmoon's dedicated kits. The level of fasting blood sugar (FBS) was categorized according to the standards set by American Diabetes Association. In this regard, FBS of less than 100 mg/dl is normal, a range from 100 to 125 mg/dl is considered as impaired fasting glucose or pre-diabetes, and FBS level of 126 mg/dl or higher is taken as diabetes [16]. The levels of blood lipids were also classified according to ATP III criteria: Triglycerides (TG) of less than 150 mg/dl is normal, in the range of 150 - 199 mg/dl is considered borderline high**,** and greater than 200 mg/dl is high. Furthermore, LDL-C less than 100 mg/dl is optimal, from 130 to 159 mg/dl is borderline high, and 160 mg/dl or higher is considered as high. In addition, HDL-C of 40 mg/dl or higher is desirable, while less than 40 mg/dl is low. Total cholesterol (TC) of less than 200 mg/dl is desirable, from 200 to 239 mg/dl is borderline high, and 240 mg/dl or higher is high. Moreover, having one or more of the following cases is considered as dyslipidemia: total cholesterol of 240 mg/dl or more, triglyceride of 200 mg/dl or higher, HDL-C of less than 40 mg/dl, and LDL-C of greater than 160 mg/dl [15].

Statistical analysis

Data was analyzed using SPSS software. Descriptive statistics (mean and standard deviation) were used to describe the data. To calculate the prevalence of risk factors, the number of people with the desirable conditions was divided by the total number of participants and the number was reported as percentage. In addition, to compare the prevalence of risk factors in work experience groups, the extended Fisher exact test was used and $P < 0.05$ was considered as the significant level.

Results

In this study, 110 male drivers were studied; among them the 36 to 45-year age group had the highest frequency (30.9%), while the 66-year and the older age group had the lowest frequency (4.5%). The mean and standard deviation of age and work experience were 46.47±11.60 and 11.36±8.85 years, respectively. Almost half of the participants (51.8%) had work experience of less than 10 years and only 4.5% had worked for more than 30 years. Most of the participants (87.3%) were non-smokers and the rest (12.7%) were smokers. Among the studied participants, 32.7% had elementary education, 22.7% had secondary education, 37.3% had a diploma, and 7.3% had university education. Demographic variables and risk factors are described in Table 1.

Table 1. Demographic characteristics and descriptive statistics

Variable	Mean (Standard deviation)
Age (years)	46.47(11.36)
Work experience (years)	11.36(8.85)
Height (cm)	172.32(6.62)
Weight (Kg)	81.38(12.71)
Waist circumference(cm)	98.27(12.82)
BMI (Kg/m^2)	27.4 (3.87)
Systolic blood pressure (mm Hg)	125.98 (14.58)
Diastolic blood pressure (mm Hg)	82.35 (12.91)
FBS (mg/dl)	101.62 (33.74)
TG(mg/dl)	187.71 (101.59)
TC(mg/dl)	191.2 (40.46)
LDL-C(mg/dl)	114.76 (37.45)
HDL-C(mg/dl)	39.84 (7.12)

BMI: Body Mass Index, FBS: Fasting Blood Sugar, TG: Triglycerides, TC: Total Cholesterol, LDL-C: Low-Density Lipoprotein Cholesterol, HDL-C: High-Density Lipoproteinn Cholesterol.

This study showed that 45.45% of the participants had BMI in the overweight range and 25.45% of them were in obesity range. Furthermore, 10% of individuals had diabetes. Among the subjects, 31.8% had triglycerides of more than 200 mg/dl, 9.1% had total cholesterol of higher than 240 mg/dl, 10.9% had LDL-C of more than 160 mg/dl, and more than half of them (50.9%) had HDL-C of less than 40 mg/dl (Table 2). The results of this study showed that 66.4% of the participants had dyslipidemia and 35.5% had hypertension.

Table 2. Prevalence of risk factors

	Categorization	Prevalence (%)
	High normal	31.8
Blood pressure	Hypertension	35.5
	Over weight	45.45
BMI	General obesity	25.45
Abdominal obesity		31.8
	Pre-diabetes	16.4
FBS	Diabetes	10
	Borderline high	26.4
TG	High	31.8
	Borderline high	26.4
TC	High	9.1
	Borderline high	17.3
LDL-C	High	10.9
HDL-C	desirable	49.1
	Low	50.9
Smoking	yes	12.7
	no	87.3

BMI: Body Mass Index, FBS: Fasting Blood Sugar, TG: Triglycerides, TC: Total Cholesterol, LDL-C: Low-Density Lipoprotein Cholesterol, HDL-C: High-Density Lipoproteinn Cholesterol.

There was no statistically significant difference among the prevalence of high TG, TC, LDL-C, low HDL-C, overweight, general obesity, abdominal obesity, hypertension, and smoking in different groups of work experience. However, there was a significant difference in the prevalence of diabetes (P = 0.007) in different groups of work experience (Table 3).

Table 3. Comparison of prevalence of CVD risk factors in work experience groups

Work experience Risk factor	1-10 n(%)	11-20 n(%)	21-30 n(%)	31-40 n(%)	p-value*
High TG	19(33.3)	14(33.3)	0(0)	2(40)	0.426
High TC	5(8.8)	3(7.1)	1(16.7)	1(20)	0.800
High LDL-C	5(8.8)	3(7.1)	2(33.3)	1(20)	0.194
Low HDL-C	32(56.1)	20(47.6)	3(50)	2(40)	0.712
Diabetes	4(7.0)	3(7.1)	1(16.7)	3(60)	0.007
Overweight	25(43.9)	20(47.6)	2(33.3)	2(40)	0.935
General obesity	12(21.1)	13(31)	2(33.3)	1(20)	0.704
Abdominal obesity	18(31.6)	19(45.2)	3(50)	2(40)	0.534
Hypertension	14(24.6)	19(45.2)	4(66.7)	2(40)	0.057
Smoking	7(12.3)	5(11.9)	1(16.7)	1(20)	0.949

*extended Fisher exact test. TG: Triglycerides, TC: Total Cholesterol, LDL-C: Low-Density Lipoprotein Cholesterol, HDL-C: High-Density Lipoprotein Cholesterol.

89.1% of participants were diagnosed with at least one risk factor, 30% with two risk factors, 22.7% with three risk factors, 14.5% with four risk factors, and 4.5% with five risk factors.

Discussion

In the current study, overweight was observed in 45.45% of individuals. The prevalence of obesity was 25.45%, including 36.1% of overweight and 16.5% of obesity, that is higher than the general population of Yazd [17].In comparison with this study, the prevalence of overweight and obesity was lower among the bus and taxi drivers of Kashan ; 41 % of bus drivers were overweight and 23.1% had obesity [18], 43.8% of taxi drivers were overweight and 24.7% of them were obese [6]. The difference in prevalence rates mentioned in these studies may be due to the difference in the investigated age groups, the presence of female gender in some studies, and the difference in the life environments. Overweight in drivers may be related to their sedentary lifestyle and nutrition.

The prevalence of smoking in this study was lower than the general population of Yazd [17], truck drivers in Sari [19], taxi drivers in Japan [7], and some other studies [8, 20]. This may be due to the lack of drivers' correct responses to the questions in the current study. The prevalence of cigarette smoking among hospital staffs [21] was lower than this study, which could be related to the participants' education and social status.

In the present study, the prevalence of hypertension, as another major risk factor for cardiovascular diseases, was higher, in comparison with the prevalence of 27.59% among the general population of Yazd [17] and 20.4% among the general population of Tehran [22]. It was also consistent with the prevalence of 35% among Brazilian bus drivers. High blood pressure in drivers is most probably due to occupational stress, poor diet, and physical inactivity, and needs more attention.

The findings of this study showed that 10% of taxi drivers in Yazd are diagnosed with diabetes; while 3.3 % of truck drivers in Sari [19], 7% of the bus drivers in Kashan [18], and 4.5% of heavy vehicle drivers in Birjand [12] had diabetes. Genetic differences and the environment can explain these differences. Regarding diabetes, it should be noted that the prevalence of this risk factor in Yazd province is higher than other regions of Iran, which is probably due to genetic differences, weather conditions, and lifestyle, especially nutrition and low physical activity [23].

The high level of triglyceride among the participants in this study is more prevalent than the workers in the tile and ceramic industry [3] and the workers in the clothing industry [24]. High serum triglyceride levels in drivers are possibly due to their unhealthy lifestyle. According to the results, the prevalence of HDL was higher among the participants in the current study than the personnel of Isfahan Electricity Distribution Company [25], the tile and ceramic industry workers [3], and the taxi drivers in Kerman [26]. Considering the effect of physical activity on HDL and physical activity rates in drivers, the difference of this risk factor between drivers and industrial workers seems logical. The difference between the participants in this study and Kerman drivers may be explained by the type of population under investigation, the difference in diagnostic criteria, the environment, and diet.

Conclusion

According to the findings of this study, cardiovascular risk factors have a high prevalence among the taxi drivers of Yazd. Occupational and individual factors can have cumulative effects on heart diseases. Occupational factors consist of forced inertia, occupational stress, and work shifts. Individual factors include lack of awareness and health check, consumption of high-fat and high-calorie foods, as well as high amounts of sugar and sweets. Cardiovascular diseases can be prevented to a large extent by modifying the lifestyle. Therefore, it is possible to prevent the occurrence of these risk factors and cardiovascular diseases by organizing training courses to encourage people to eat healthy foods, quit smoking, lose weight, avoid stress, and emphasize on exercising.

Some limitations of the current study are lack of control group and non-participation of female

drivers. On the other hand, considering the cross-sectional nature of this study, a causal inference about the risk factors for developing CVD and the occupation of the study group is impossible. In this regard, it is suggested that future studies be conducted taking into account the female drivers and also perform the case-control or cohort studies to know more about mentioned risk factors among taxi drivers.

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Conflict of interest

The authors have no conflicts of interest to report.

References

1. AL-Nooh AA, Abdulabbas Abdulla Alajmi A, Wood D. The prevalence of cardiovascular disease risk factors among employees in the Kingdom of Bahrain between October 2010 and March 2011: a cross-sectional study from a workplace health campaign. Cardiology Research and Practice. 2014; 2014:1-9.
2. Ramakrishnan J, Majgi SM, Premarajan KC, et al. High prevalence of cardiovascular risk factors among policemen in Puducherry, South India. Journal of Cardiovascular Disease Research. 2013; 4(2): 112-5.
3. Mehrparvar AH, Mirmohammadi SJ, Mostaghaci M, et al. Prevalence of cardiovascular risk factors among tile and ceramic workers in Yazd, Iran. ISRN Preventive Medicine. 2013; 2013: 1-6.
4. Després J-P, Arsenault BJ, Côté M, et al. Abdominal obesity: the cholesterol of the 21st century?. Canadian Journal of Cardiology. 2008; 24(supplement D) :7D-12D.
5. Hirata RP, Sampaio LM, Leitao Filho FS, et al. General characteristics and risk factors of cardiovascular disease among interstate bus drivers. The Scientific World Journal. 2012; 2012: 1-7, ArticleID 216702.
6. Elshatarat RA, Burgel BJ. Cardiovascular risk factors of taxi drivers. Journal of Urban Health. 2016; 93(3): 589-606.
7. Kurosaka K, Daida H, Muto T, et al. Characteristics of coronary heart disease in Japanese taxi drivers as determined by coronary angiographic analyses. Industrial Health. 2000; 38(1): 15-23.
8. Chen JC, Chen YJ, Chang WP, et al. Long driving time is associated with haematological markers of increased cardiovascular risk in taxi drivers. Occupational and Environmental Medicine. 2005; 62(12): 890-4.
9. Ishimaru T, Arphorn S, Jirapongsuwan A. Hematocrit levels as cardiovascular risk among taxi drivers in Bangkok, Thailand. Industrial Health. 2016; 54(5): 433-8.
10. Gany F, Bari S, Gill P, et al. Step On It! Workplace cardiovascular risk assessment of New York city yellow taxi drivers. Journal of Immigrant and Minority Health. 2016; 18(1): 118-34.
11. Apantaku-Onayemi F, Baldyga W, Amuwo S, et al. Driving to better health: cancer and cardiovascular risk assessment among taxi cab operators in Chicago. Journal of Health Care for the Poor and Underserved. 2012; 23(2): 768-80.
12. Kazemi T, Sadeghi-Khorashad M, Salehi-Give A. Evaluation of cardiovascular risk factors in drivers of heavy vehicles in the South Khorasan (2009-2010). Journal of Birjand University of Medical Sciences. 2013; 19(6): 26-32.
13. Gabb GM, Mangoni A, Anderson CS, et al. Guideline for the diagnosis and management of hypertension in adults—2016. Mortality. 2016; 205(2): 85-89.
14. WHO EC. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet (London, England). 2004; 363(9403): 157.
15. Panel NCEPNE. Third report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (Adult Treatment Panel III) final report. Circulation. 2002; 106(25): 3143-421.
16. Association AD. Standards of medical care in diabetes—2014. diabetes care 2014; 37 (suppl. 1): s14–s80diagnosis and classification of diabetes mellitus. Diabetes Care 2014; 37 (Suppl. 1): S81–S90. Diabetes Care. 2014; 37(3): 887-.
17. Namayandeh SM, Sadr S, Ansari Z, et al. A cross-sectional study of the prevalence of coronary artery disease traditional risk factors in Yazd urban population, Yazd healthy heart project. Iran Cardiovasc Research Journal. 2011; 5(1): 7-13.

18. Saberi H, Moraveji A, Parastouie K. Metabolic syndrome among professional bus and truck drivers in Kashan, 2008. Iranian South Medical Journal. 2009;12(2):126-32.
19. Taraghi Z, Ilali E. Hypertension screening in truck drivers. Journal of Hayat. 2004; 10(2): 63-9.
20. Yazdi Z. Prevalence of Metabolic Syndrome among Truck Drivers and Its Relation to Shift Work. Qom University of Medical Sciences Journal. 2012; 5(4).
21. Leong L, Chia SE. Prevalence of cardiovascular risk factors among healthcare staff in a large healthcare institution in Singapore. Singapore Medical Journal. 2012; 53(8): 517-21.
22. Azizi F, Rahmani M, Emami H, et al. Cardiovascular risk factors in an Iranian urban population: Tehran lipid and glucose study (phase 1). Sozial-und Präventivmedizin/Social and Preventive Medicine. 2002; 47(6): 408-26.
23. Lotfi MH, Saadati H, Afzali M. Prevalence of diabetes in people aged≥ 30 years: the results of screen-ing program of Yazd Province, Iran, in 2012. Journal of Research in Health Sciences. 2013; 14(1): 88-92.
24. Fatema K, Natasha K, Ali L. Cardiovascular risk factors among Bangladeshi ready-made garment workers. Journal of Public Health in Africa. 2014; 5(2): 373.
25. Bahonar A, Shahnam M, Asadi-Lari M, et al. Risk factors of cardiovascular diseases among workers in Isfahan. Iran Occupational Health. 2010; 7(1): 1-0.
26. Nasri H, Moazenzadeh M. Coronary artery disease risk factors in drivers versus people in other occupations. ARYA Atheroscler. 2010; 2(2): 75-78.