Medicina Sportiva (2017), vol. XIII, no 2, 2888-2896
Journal of the Romanian Sports Medicine Society

Obesity and associated risk factors among adult males: prevalence investigation in cross-sectional study

Javad Mehrabani, Arsalan Damirchi, Zeynab Khazraei Ganjifar
Department of Exercise Physiology, University of Guilan, Rasht, Iran

Abstract. The prevalence of obesity associated risk factors and lifestyle physical activities were evaluated in 1218 Public Transport Drivers (Taxi drivers) of Tehran (capital of Iran). The degree of obesity evaluated by self-reported on kg/m^2; lifestyle behaviors and demographic factors involve physical activity, marital status, house type, level of education, household income, smoking, sleep and rest status, family history of cardiovascular disease and eating attitudes by a questionnaire administrated by Adami and Corderra (2003) on Mediterranean eating style that was adopted with Iranian population lifestyle. Blood pressure measured with a handy sphygmomanometer. Range of age was between 21 to 71 years. Individuals under 35 years of age were classified as younger, from 36 to 50 as middle aged and over 50 as older. Overweight was defined as body mass index (BMI) = 25 to 29.9 kg/m^2 and obesity as BMI $\geq$30 kg/m^2. Hypertension was defined according to the WHO criteria as systolic BP >140 mm Hg, or diastolic BP >90 mm Hg, or both. Prevalence of obesity, overweight and both of them were 40.6%, 26.6%, and 67.2%, respectively.
Prevalence of obesity, overweight and high blood pressure significantly increases with increase of aging, household income, family members, and low level of education and physical activity ($p<0.05$). In all age groups, there was significant association between obesity and high blood pressure ($p<0.0001$). Highest prevalence of obesity (50.3%) and high BP (71.1%) were observed in older group. Obese persons in all groups had high BP ($p<0.05$). Furthermore, significant relationship was observed between body mass index and many food consumption habits, for example using high-fat foods, candies, snacks, desserts, and negative relationship with spending work and leisure time physical activities and being careful about what and how much is eaten.
According to these findings, it seems that it is imperative to avoid obesity as a main general health risk factor, and also reinforcing cognitive patterns and promoting Iranian lifestyle behaviors such as increase of leisure time physical activities and reformation of eating habits may be effective in the fight against hypertension and obesity.
***Key words**: obesity, lifestyle behaviors, physical activity, hypertension.*

Introduction

Obesity is an undesirable outcome of changing of lifestyle and behaviors. The prevalence of obesity and overweight is increasing in many developing countries (1,2), especially in Iran population (3). Many national population-based studies showed high prevalence of obesity in Tehranian adults (4). Obesity is related with different problems. One of the results of obesity is high blood pressure (high BP). The prevalence of high BP -even in treated subjects- is excessive in Iran (5). This increased prevalence may reflects a change in lifestyle patterns influenced by an overabundance of food choices and fatty foods, industrialization, technology (6), and convenience with decreased opportunities and motivations for regular physical activity. Evidence from epidemiological studies revealed that consumption of animal fats (7), high body mass index (BMI), aging (8), obesity (1), smoking (5,9), and inadequate physical activity (4,10) are related to hypertension. Another study, also, showed that relationship between physical activity and BP may be modified by a family history of coronary heart disease (CHD) (11).
The benefits of physical activity for public health are widely accepted by both experts and lay people (7,12). Many studies have demonstrated that regular physical activity is related to a decreased of obesity (13,14) and reduced risk of hypertension in men (15). Part of this effect is thought to be mediated through improved lipid metabolism, decreased body weight (16) and increased aerobic power (17). Also, evidence from epidemiological studies have concluded that overweight, obesity and weight gain are associated with an increased risk of hypertension (18,19).

According to estimates, more than half of diseases are related to lifestyle (20). Also, the scientific literature shows that adverse modifiable health risks such as physical inactivity and obesity are related to morbidity (21).

Material and Method

This investigation was carried out on 1250 men among the Tehranian Taxi drivers. For selection of subjects, Tehran divided to five areas (north, south, west, east and centre) and 250 drivers were selected from each area. After awareness of study aim, the participants received a questionnaire administered by Adami and Cordera (2003) (22) that developed for this study. The questionnaire included 19 items and two-choice answers (Yes/No) about lifestyle behaviours and demographics of Tehranian adults containing age, height and weight, education level, marital status, house type, number of family members, family history of obesity, diabetes, hypertension, sleep habits, eating patterns, eating habits, physical activity, smoking, and household income. In order to obtain content and face validity, four university professors in exercise physiology and nutrition reviewed the questionnaire and suggested necessary modifications. This standpoint showed a validity coefficient equal to 0.84. Finally, another professor reviewed the questionnaire and made final revisions before give out to participants. The study was approved by the University of Guilan Ethics Committee.

Questionnaire was given in work place. Systolic BP and diastolic BP were measured using a standard manual mercury sphygmomanometer thrice in sitting position after 15 minutes rest between 9 to 12 A.M and mean values were obtained in all cases. High BP was defined as systolic BP of $\geq$140 mm Hg and diastolic BP of $\geq$90 mm Hg or both. BMI was calculated as kg/m^2 based on recommendations of the World Health Organization (6). Normal weight, overweight and obesity were defined as follow: normal weight (BMI 18.5-24.9 kg/m^2), overweight (BMI 25-<30 kg/m^2), and obese (BMI $\geq$30 kg/m^2). Individuals under 35 yrs. of age were classified as younger, those from 36-50 as middle aged and those over 50 as older. Education levels were divided into the current education levels in Iran. The participants were classified into three smoking categories: current smokers (<20 cigarettes per day), ex-smokers (>20 cigarettes per day), and non-smokers. The subjects reported their leisure time and occupational physical activities according to the following two categories: (a) light, which was considered physically very easy, included watching TV, go to buy, standing at the Taxi station, speaking with fellows, or doing some minor physical activities but not of moderate or high level, and driving below 4 hours per day; and (b) active, which included walking at the Taxi station 30 to 60 minutes at different times, leisure time or sport physical activities at home or outside < or >30 minutes per day for 1 or more times per week, and driving >4 hours per day.

According to these reports, home, occupational, and leisure time physical activities were classified into three categories: (1) low, defined as almost completely inactive or very low physical activities (e.g., activities of first state included buying, watching TV, or doing some minor physical activities), and driving <4 hours per day; (2) moderate, defined as the participants who did part of second state included low-to-moderate exercise activities <30 minutes per day for 1 or 2 times per week, or driving between 4 to 7 hours; and (3) high, defined as they did part of second state contained moderate-to-high physical activity >30 minutes per day for $\geq$3 times per week regularly, and driving >7 hours per day.

The subjects were classified into three house type categories: personal, organizational, and rented. Marital status were categorized into four groups: unmarried, and married with 2, 3, and $\geq$4 persons. Monthly household incomes have been classified into five categories on Iranian monetary unit: <8000, 8001-15000, 15001-20000, 20001-25000, and >25000 thousand Rails (Rail is monetary unit of Iran and ~32000 Rails are one US dollar). Family history of CHD risk factors were divided in two groups: Yes or No. Sleep habits, also, classified in four categories: irregular, <6, 6-8, and $\geq$ 8 hours.

Analyses were carried out on the data of the 1218 fully completed questionnaire, while the other 32 questionnaires have not been filled. SPSS for Windows 11.50 was used for statistical analyses. The results were reported by absolute and relative (frequency, mean and percent). To assess of normality, Kolmogorov-Smirnov test is used. If normal distribution observed, parametric statistical methods is used, and other data were evaluated by nonparametric methods (table 1).

So, independent t test, Kreskas-Wallis for analyses of variance, $\chi 2$, and multivariate and single regression models were used for analysis of data. All statistical inferences were based on a significance level of $p<0.05$.

Table 1. Kolmogorov-Smirnov test for major variable

	K-S (Z)	Asymp. Sig.
BMI	0.456	0.447
Systolic BP	0.359	0.916
Diastolic BP	0.535	0.607
Physical activity	0.613	0.224

**The lack of significant to use of non-parametric statistics*

Results

Prevalence of obesity and overweight is illustrated in table 2. Of the 1218 participants, 312 (25.6%) individuals were <35, 638 (52.3%) 36-50, and 268 (22%) >50 yrs. old. Range of BMI was 19.3 to 40.28 kg/m^2 (mean = 27.68 ± 5.41). 67.2% (n = 817) of participants were obese or overweight (26.6%; n = 322 obese and 40.6%; n = 495 overweight). Prevalence of obesity increased with age (χ^2 = 88.12; p = 0.0001). Also, overweight was higher in the 36 to 50 yrs. old age group. None of the subjects had BMI <18.5 (low weight categorized).

Table 2. Prevalence of obesity (BMI, kg/m^2) and overweight on age (yrs.).

Age	Total		BMI <25		BMI=25.0-29.9		BMI ≥30		**p* value
	n	%	n	%	n	%	n	%	
<35 yrs.	312	25.6	161	51.6	49	15.7	102	32.6	0.0001
36-50 yrs.	638	52.3	175	27.4	205	32.1	258	40.5	<0.0001
>50 yrs.	268	22.0	65	24.2	68	25.3	135	50.3	0.0001
Total	1218	100.0	401	32.9	322	26.6	495	40.6	0.0001

** χ^2 test was used for categorical variables.*

The prevalence of overweight and obesity is illustrated in table 3. When high BP was considered, there was positive significant relationship between increased BP and obesity (p <0.0001); Table 3). Obese participants with (BMI ≥30 kg/m^2) showed a higher prevalence of high BP when they were compared with other BMI categories. If physical activity was considered, an inverse relationship was observed between physical activity and prevalence of obesity and BMI (p = 0.0001; Table 3).

Prevalence of obesity increased with decreasing physical activity. 53.9% (n = 572) and 31.1% (n = 331) of individuals who had insufficient physical activity were obese and overweight, respectively. Although Interesting of physical activity in relation to global recommendations, just 2.2% (n = 27) of all participants had sufficient physical activity. In all age groups, 87.2% (n = 1062) were insufficiently physically active.

As education level increased, the prevalence of obesity decreased. In fact, there was an inverse association between education level and prevalence of obesity (p = 0.002; table 3), with highest prevalence in illiterate participants (46.6%; n = 28) and lowest in people who graduated from university (14.2%; n = 23). We found a significant relationship between marital status and obesity (p = 0.002; table 3). Prevalence of obesity was highest in married with 4 persons or more (44.8%; n = 207) and lowest in unmarried people (25.1%; n = 46). As for house type, a relationship with obesity was seen (0.039; table 3). Prevalence of obesity was highest in people who had personal house (45.9%; n = 201). Also, there was a positive significant relationship between household income and prevalence of obesity (p = 0.0001; table 3). We observed a significant relationship between prevalence of obesity and smoking (p = 0.0001; table 3). Prevalence of obesity was lower in non-smokers (27.4%; n = 85) than current and ex-smokers. Whereas, 25.4% of participants (n = 310) were non-smoker.

As illustrated in Table 3, the prevalence of obesity in participants who had a family history of CHD risk factors (such as obesity, diabetes, or hypertension) was higher than participants who had no family history of CHD (p <0.0001). Of the participants, 58.9% (n = 718) reported one of CHD risk factors in their families.

Table 3. Prevalence of obesity and overweight (BMI, kg/m^2) on demographics and lifestyle behavior.

Variables	Total		BMI <25		BMI=25.0-29.9		BMI ≥30		*p value
	n	%	n	%	n	%	n	%	
High BP (mm Hg)	432	35.4	54	13.4	118	36.6	260	52.5	<0.0001
Physical activity									0.0001
Low	1062	87.2	159	14.9	331	31.1	572	53.9	
Moderate	129	10.6	56	43.1	28	21.7	45	34.9	
High	27	2.2	11	40.7	9	33.3	7	25.9	
Education level									0.002
Illiterate	60	4.9	13	21.6	19	31.6	28	46.6	
Primary	122	10.0	31	25.4	29	23.7	62	50.8	
Secondary	232	19.0	46	19.8	97	41.8	89	38.3	
High school	642	51.7	289	45.0	197	30.6	156	24.3	
University	162	13.3	93	57.4	46	28.3	23	14.2	
Total	1218	100.0	472	38.7	388	31.8	358	29.4	
Marital status									0.002
Single	183	15.0	86	46.9	51	27.8	46	25.1	
Married (2 person)	137	11.2	36	26.2	52	37.9	49	35.7	
(3 person)	436	35.8	99	22.7	156	35.7	181	41.5	
(≥4 person)	462	37.9	87	18.8	168	36.3	207	44.8	
Total	1218	100.0	308	25.3	427	35.0	483	39.6	
House type									0.039
Personal	438	36.0	106	24.2	131	29.9	201	45.9	
Rented	593	48.7	176	29.6	219	36.9	198	33.4	
Organizational	187	15.4	54	28.8	59	31.5	74	39.5	
Total	1218	100.0	336	27.6	409	33.6	473	38.8	
Income (IR.Rials; thousand)									0.0001
<8000	176	14.4	64	37.2	61	34.6	51	28.9	
8001-15000	307	25.2	101	32.9	109	35.5	97	31.5	
15001-20000	462	37.9	166	35.9	112	24.2	184	39.8	
20001-25000	145	11.9	42	28.9	34	23.4	69	47.6	
>25000	128	10.5	27	21.1	34	26.5	67	52.3	
Smoking									0.0001
Non-smoker	310	25.4	129	41.6	96	30.9	85	27.4	
Current smoker (≤20)	705	57.9	126	17.8	271	38.4	308	43.6	
Ex-smoker (>20)	230	16.6	59	25.6	82	35.6	89	38.7	
History of CHD risk factors									<0.0001
No	500	41.1	261	52.2	153	30.6	86	17.2	
Yes	718	58.9	188	26.2	299	41.6	231	32.1	
Total	1218	100.0	449	36.8	452	37.1	317	26.0	
Sleep habits									0.059
Irregular	38	3.1	13	34.1	9	23.6	16	42.1	
<6 hours	532	43.7	182	34.2	224	59.5	126	23.7	
6-8 hours	376	30.8	101	26.8	129	34.3	146	38.8	
≥8 hours	272	22.3	61	22.4	74	27.2	137	50.3	

** Kruskal-Wallis was used for continues variables and χ^2 test for categorical variables.*

The prevalence of high BP stratified by age and BMI is reported in table 4 and figure 1.The rate of BMI was higher in people who had high BP more than normotensive in all age groups (Figure 1).
Prevalence of hypertension was 35.4% (n = 432). There was a strong liner association between BMI and high BP (χ^2 = 69.63; p = 0.0001). Prevalence of high BP was 52.3% (n = 260) in obese participants. Also, in all age categories, obese participants had higher BP. In fact, 29.4% of young 51.9% of middle aged, and 71.1% of old obese men had high BP.

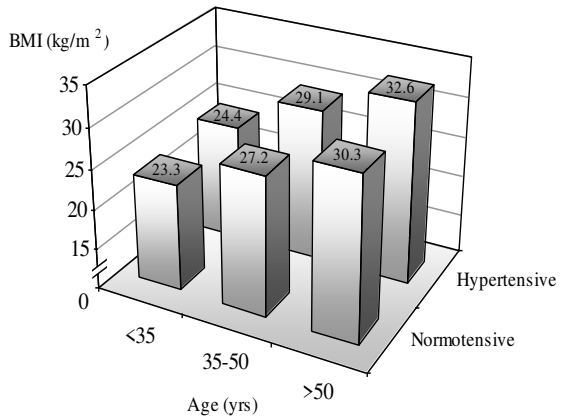

Figure 1. Body mass index (kg/m^2) on age and blood pressure conditions (Normal BP and high BP). ANOVA for analyses of variance for differences between age groups and independent *t* test between high and normal BP groups were used (p <0.05).

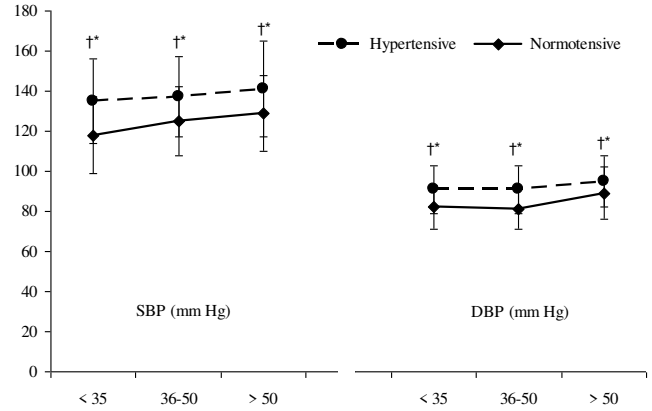

Figure 2. Systolic and diastolic blood pressure on age. (N.B.P: Normal BP; H.B.P: High BP).
*Significant difference with independent t test between high and normal BP groups (p <0.05). †Significant difference with Kruskal-Wallis test between age groups (p <0.05).

Table 4. Prevalence of high BP (140/90 mm Hg) on obesity degree (BMI, kg/m^2) and age.
* χ^2 = 69.63; p = 0.0001

Age (yrs.)	BMI	N	High BP (n)	High BP (%)	*p value
<35					0.0001
	<25	161	14	8.7	
	25-29.9	49	12	24.4	
	≥30	102	30	29.4	
	Total	312	56	17.9	
36-50					<0.0001
	<25	175	18	10.3	
	25-29.9	205	68	33.1	
	≥30	258	134	51.9	
	Total	638	220	34.4	
>50					<0.0001
	<25	65	22	33.8	
	25-29.9	68	38	55.8	
	≥30	135	96	71.1	
	Total	268	156	58.2	
Total					<0.0001
	<25	401	54	13.4	
	25-29.9	322	118	36.6	
	≥30	495	260	52.5	
	Total	1218	432	35.4	

Also, there was a significant difference between systolic and diastolic BP in different age groups (Figure 2). It was higher in older.71.1% of old obese men had high BP. Also, there was a significant difference between systolic and diastolic BP in different age groups (Figure 2). It was higher in older.
Investigation of relationship between each of demographics, lifestyle variables, socioeconomic components and physiological factors showed that participants who had high BP were slightly older and their BMI, systolic and diastolic BP were higher (Figure 2). They were less physically active, less educated, ex-smokers and had low household income, personal house except older group (but high BP was prevalent in younger

and middle aged who had rented house), irregular and less sleep, and higher family numbers except older categories (Table 5).

Singles and multiple regressions between obesity, nutrition status and lifestyle behaviors have been showed in table 6. There was a positive relation between obesity and consumption of fatty foods and snacks ($p < 0.05$), and had a negative relationship with healthy physical activities and taking care on nutrition. Also, we observed a direct relationship between obesity and High BP ($p < 0.05$). Obese men were hypertensive.

Table 5. Prevalence of hypertension (percentage quantities) on age, demographics and lifestyle behaviors

	Age <35 yrs.			Age 36-50 yrs.			Age >50 yrs.		
Variable	Normo-tensive (n=256)	Hyper-tensive (n=56)	*p value	Normo-tensive (n=418)	Hyper-tensive (n=220)	*p value	Normo-tensive (n=112)	Hyper-tensive (n=156)	*p value
Age (yrs.)	29.5	28.1	<0.059	42.7	44.4	<0.21	56.4	59.2	<0.001
BMI (kg/m^2)	23.3±2.3	24.6±2.5	<0.001	27.2±2.1	29.1±2.8	<0.001	30.3±3.7	32.6±4.1	<0.002
Systolic BP (mm Hg)	118±19	135±21	<0.017	125±17	137±20	<0.01	129±19	141±24	<0.001
Diastolic BP (mm Hg)	82±11	91±12	<0.02	84±10	91±12	<0.04	89±13	95±13	<0.002
Physical activity (%)			<0.0001			<0.001			<0.0001
Low	11.7	45.7		10.3	46.3		7.9	15.9	
Moderate	38.5	38.1		38.3	40.8		36.4	37.4	
High	49.8	16.2		51.5	12.9		55.7	10.8	
Education level (%)			0.012			<0.003			<0.001
Illiterate	4.8	7.6		5.6	7.5		6.4	8.1	
Primary	16.2	23.1		20.3	24.2		40.7	42.2	
Secondary	19.7	23.4		34.4	33.9		33.5	29.3	
High school	36.6	30.7		27.2	25.4		16.9	17.2	
University	22.7	15.2		12.4	9.0		2.4	3.2	
Marital status (%)			<0.02			<0.078			<0.042
Single	41.3	25.0		37.6	25.7		31.6	27.1	
Married (2 person)	29.4	21.7		30.7	26.9		24.4	22.2	
(3 person)	12.6	24.1		17.2	20.7		21.9	24.2	
(≥4 person)	16.7	29.2		14.4	26.6		23.9	26.5	
House type (%)			0.049			0.011			<0.041
Personal	41.2	37.6		50.5	33.1		59.3	56.1	
Rented	47.9	46.3		28.2	41.5		18.2	23.4	
Organizational	10.8	16.1		21.3	25.4		22.4	20.5	
Income (IR.Rials; thousand; %)			<0.0002			0.002			0.004
<8000	24.2	25.3		27.2	26.8		23.0	21.9	
8001-15000	23.7	22.9		21.1	21.6		20.6	19.5	
15001-20000	20.1	21.3		18.7	17.2		19.7	18.4	
20001-25000	18.2	19.1		17.2	17.6		19.1	20.3	
<25000	13.8	11.4		15.8	16.8		17.7	19.9	
Smoking (%)			0.002			<0.001			<0.0001
Non-smoker	67.6	15.3		47.8	16.6		49.6	27.2	
Current smoker	19.1	28.3		21.8	34.1		36.3	18.5	
Ex-smoker	13.3	56.4		30.4	49.3		14.3	54.3	
History of CHD risk factors			<0.021			<0.041			<0.001
No	61.7	56.9		59.6	52.7		58.9	50.8	
Yes	38.3	43.1		40.4	47.3		41.1	49.2	
Sleep habits			<0.001			<0.0001			0.0001
Irregular	12.1	34.2		12.6	26.5		13.5	41.0	
<6 hours	27.1	24.3		25.6	23.6		24.1	27.3	
6-8 hours	36.2	19.8		37.9	19.6		35.7	10.5	
>8 hours	*24.7*	*21.6*		23.9	20.3		26.7	11.2	

** Kruskal-Wallis was used for continues variables and X^2 test for categorical variables.*

Table 6. Relation between obesity, food conditions and lifestyle behaviors

	Coefficient	Standard error	χ^2	*p value	Lower 95% SI	Upper 95% SI
Constant variable	-0.230	0.412	2.216	0.221	0.451	1.873
Have a fatty foods, snack and dessert	-2.045	0.309	5.631	0.013	0.195	1.022
Spent of times for physical activity	1.123	0.433	6.963	0.0030	1.934	5.244
Being careful about foods and meals	-1.006	0.367	9.375	0.0028	0.461	1.031
Improper sleep habits	2.219	0.387	5.454	0.041	1.174	2.018

**Analysis with multiple logistic regression*

Discussion

This study provides information about the relationship between hypertension, food consumption, demographic factors and obesity Persian adult men. More than 40 percent of this part of working adults men was classified as obese, which clearly reflects the prevalence of obesity observed by Azadbakht et al. (4) in Tehranian adults. They reported that prevalence of obesity was 29% in Tehranian adult men. In their study, subjects were obese when their BMI was $\geq$24 kg/m^2. The variation may be explained by differential distribution in risk factors (e.g., genetic, dietary, low level of physical activity, and age) between the results of their study with the present study. Prevalence of obesity varies from 2% to 80% worldwide (1). Of the subjects included in our sample, 40.6% were obese (BMI $\geq$ 30) and 26.6% were overweight (BMI 25 to <30). Our data, therefore, confirm the increasing problem of obesity in Iran. Overweight and obesity is considered the third most important risk factor of attributable burden of disease (23). The majority of published studies on physical activity are prospective cohort studies showing an association between low physical activity and the risk of coronary heart disease (24). In Turkey, 9% of adult men were obese in 2003 (1). Erem et al. (9) and Onat et al. (25) showed that prevalence of obesity was 10.7% in Turkish adult men.
Also, the prevalence was 16% in Trabzon city. In other study, Adami and Cordera (22) showed that prevalence of obesity was 22% in 500 men employees by the Public Transport Company of Genova, Italy.
Age is strongly associated with obesity 926). As well as our finding, in many studies, it has been showed that obesity increases with age (9,22,27).
The highest prevalence of obesity was in the 50-yaers-old age group (50.3%). Interestingly, ~24.2% of individuals had a BMI $\geq$25 kg/m^2 in older age group. In fact, 25.3% of this group was in overweight class. The prevalence of obesity in older group was very high.
The relation between obesity and age can be explained, in part, by a decrease in the degree of physical activity with age (27). Our finding showed that more than 87% participants were inadequately physically active, while 10.6% reported that had moderate physical activity, and just 2.2% individuals had enough physical activity according to American College of Sports Medicine (ACSM) recommendations (28). In a comparable cross-sectional study in northern Iran, regular physical exercise was reported in 27.6% of subjects aged 45–70 years (3). Whereas, Brown et al. (29) showed that 39.4% of men in the 41–65 years age group reported no physical exercise, however, 61.6% of them had >0–2 hours of physical activity per week, minimally. Of course, in this group a basic problem in assessing parameters related to physical activity are the survey instruments used in each respective study, which can result in significant differences in the reported physical fitness of the populations surveyed (29). So, differences in prevalence of overweight and obesity in subjects among the different categorical age may be described by sedentary lifestyle and improper eating habits (Table 5).
Individuals that had family history of CHD risk factors such as diabetes, heart attack, and etc. were obese. So, it seems that, there is a positive association between history of cardiovascular disease and weight gain. In agree with our findings, Erem et al. (9) reported that prevalence of obesity in subjects who had family history of CHD was higher than individuals who had no family history.
We observed a significant increase in BP in obese individuals with BMI $\geq$30 kg/m^2. Although, in general, prevalence of hypertension was high in all subjects (35.4%). Gang et al. showed a positive relationship between increase of BMI and hypertension (16). They believed that weight control can decrease BP in hypertensive and normotensive men. This data suggest that high BP was related only in conditions of obesity.
In this study, BMI and smoking were both independently associated with risk of hypertension. In both current smokers and ex-smokers, a high BMI was associated with a high risk of being hypertensive. People who had High BP, were reported a history of CHD in their family and had not adequate physical activity. It seems that association between physical activity and BP is modified by a family history of cardiovascular

heart disease (11). These results were similar to previous studies (1,7,8,30). Smoking is the most important attributable risk factor to the burden of disease in world especially in high-income countries (23).
We found a negative relationship between physical activity and stricken to hypertensive. Analyses from cross-sectional studies have indicated that physical activity is inversely associated with BP level and the prevalence of hypertension (31). However, studies on the prospective association of regular physical activity with the risk of hypertension are scant and the results inconsistent. It was reported that there is a relationship between reduction in BP with and regular physical activity in both hypertensive and normotensive, and both overweight and normal weight men in Finland (31).
The results of this study indicated an increased rate of obesity and overweigh in the Taxi drivers. With respect to these findings, low level of activity and education, matrimony, family history of obesity, and ageing are responsible for both obesity and overweight in participants. Therefore, it seems that community-based multiple strategies are required to combat with increasing rate of obesity and its subsequent complications such as diabetes, coronary artery disease, hypertension and osteoarthritis. In general, a limitation of the conducted study might be a possible selection bias. As it was necessary for the subjects to appear in person in the study place especially persons with illnesses might be underrepresented. Missing values (i. e. missing laboratory parameters) also could have created a selection bias.
In conclusion, our survey revealed that overall prevalence of preventable risk factors is high. An overall goal to improve public health should address physical activity levels, healthy eating, and tobacco consumption. A preventive strategy with a focus on diet and physical activity offers the perspective of improving health in the population.

Conclusion

The research has confirmed that prevalence of overweight and obesity was high in local transport system drivers of Tehran. The prevalence was increased with age and low level of physical activity. It seems, also, improved socioeconomic condition, low level of education and married status are major elements for prevalence of obesity, and overweight. Also, increase in body mass index is related to hypertension as a pandemic variable. For weight management, the control of nutrition status and increase of regular physical activities is necessary. Modifications of lifestyle are suitable manner for decrease of obesity related disorders, as well as improve of health knowledge. So, it is recommended that management of the weight and restriction of the food uptakes seriously for weight control and obesity.
*Competing interests***.** The author(s) declare that they have no competing interests. *Author's contributions.* All authors have made significant contributions to this paper. JM was the main author of the manuscript and was involved in all aspects of this paper. AD and ZKG contributed equally to the conception, design, edition, and to the interpretation of this study. All authors read and approved the final manuscript.
Acknowledgment. The authors would like to express their appreciation to the subjects for their participation in this study.

References

1. Erem C, Arslan C, Hacihasanoglu A, Deger O, Topbas M, Ukinc K, Ersoz HO, Telater M (2004). Prevalence of obesity and association risk factors in Turkish population (Trabzon, Turkey). *Obes Res*; 12(7):1117-1127.
2. Swinburn B, Egger G (2002). Prevention strategies against weight gain and obesity. *Obes Rev*; 3(4):289-301.
3. Hajian-Tilaki KO, Heidari B (2007). Prevalence of obesity, central obesity and the associated factors in urban population aged 20-70 years, in the north of Iran: a population-based study and regression approach. *Obes Rev*; 8(1):3-10.
4. Azadbakht L, Mirmiran P, Shiva N, Azizi F (2005). General obesity and central adiposity in representative sample of Tehranian adults: prevalence and determinants. *Int J Vitam Nutr Res*; 75(4):297-304.
5. Sadeghi M, Roohafza HR, Kelishadi R (2004). Blood pressure and associated cardiovascular risk factors in Iran: Isfahan Healthy Heart Programme. *Med J Malaysia*; 59(4):460-467.
6. *World Health Organization*: Process for a global strategy on diet, physical activity and health Genf: World Health Organization 2003.
7. Berner A, Al-Suwaidi J, Al-Jaber K, Al-Marri S, Dagash MH, Elbagi IE (2004). The prevalence of hypertension and its associated risk factors in a newly developed country. *Saudi Med J*; 25(7):918-922.
8. Jo I, Ahn Y, Lee J, Shin KR, Lee HK, Shin C (2001). Prevalence, awareness, treatment, control and risk factors of hypertension in Korea: the Ansan study. *J Hypertens*; 19(9):1523-1532.
9. Erem C, Yildiz R, Kavgaci H, Karahan C, Deger O, Can G, Telatar M (2001) Prevalence of diabetes, obesity and hypertension in a Turkish population (Trabzon city). *Diabetes Res Clin Prac;* 54(3):203-208.

10. Luke A, Kramer H, Adeyemo A, Forrester T, Wilks R, Schoeller D, Leman C, Cooper RS (2005). Relationship between blood pressure and physical activity assessed with stable isotopes. *J Hum Hypertens*; 19(2):127-132.
11. Garcia K, Eisenmann JC, Bartee RT (2004). Does a family history of coronary heart disease modify the relationship between physical activity and blood pressure in young adults? *Eur J Cardiovasc Prev Rehabil*; 11(3):201-206.
12. Rutten A, Abel T, Kannas L, Von Lengerke T, Luschen G, Diaz JA, Vinck J, van der Zee J (2001). Self report physical activity, public health, and perceived environment: results from a comparative European study. *J Epidemiol Community Health*; 55 (2):139-144.
13. Vasilescu M., Rusu L, Balseanu TA., Cosma G., Dragomir M. (2011). Effects of the Intermittent Exercise Programs on Lipid Profile and Anthropometric Characteristics at Obese Young Subjects. *World Acad Sci Eng Technol*; pp 952-955.
14. Parsamehr M, Zare-Shahabadi A (2008). Role of benefits perceived on the youth women participation in physical activities (case survey: Yazd city). *Olympic*; 41(1): 7-16.
15. Pereira MA, Folsom AR, McGovern PG, Carpenter M, Arnett DK, Liao D, Szklo M, Hutchinson RG (1999). Physical activity and incident hypertension in black and white adults: the Atherosclerosis Risk in Communities Study. *Prev Med*; 28(3):304-312.
16. Hu G, Barengo NC, Tuomilehto J, Lakka TA, Nissinen A, Jousilhati P (2004). Relationship on physical activity and body mass index to the risk of hypertension: a prospective study in Finland. *Hypertension*; 43(1):25-30.
17. Rahmani-nia F, Daneshmandi H, Mehrabani J (2007). The effects of a fitness program on endurance and fitness related knowledge in sedentary college men. *Int J Fitness*; 3(1):33-40.
18. Hamet P, Pausova Z, Adarichev V, Adaricheva K, Tremblay J (1998). Hypertension: genes and environment. *J Hypertens*; 16(4):397-418.
19. Hu G, Tian H (2001). A comparison of dietary and non-dietary factors of hypertension and normal blood pressure in a Chinese population. *J Hum Hypertens*; 15(7):487-493.
20. Hoger WK, Hoger SA (2006). *Principles and labs for physical fitness*. Thomason/Wadthworth.
21. Pronk NP, Martinson B, Kessler RC, Beck AL, Simon GE, Wang P (2004). The association between work performance and physical activity, cardiorespiratory fitness, and obesity. *J Occup Environ Med*; 46(1):19-25.
22. Adami GF, Cordera R (2003). Association of body mass index, physical activity and eating pattern in adult men. *Nutr Res*; 23: 579-583.
23. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL (2006). Global Burden of Disease and Risk Factors. New York: *Oxford University Press*.
24. Batty GD (2002). Physical activity and coronary heart disease in older adults. A systematic review of epidemiological studies. *Eur J Public Health*; 12(3):171-176.
25. Onat A, Ceyhan K, Erer B, Basear O, Uysal O, Sansoy V (2003). Systolic, diastolic pressure and pulse pressure as coronary risk factors in a population with low cholesterol levels prospective 10-year evaluation. *Clin Cardiol*; 26(2):91-97.
26. Brown W, Bauman A, Chey T, Trost S, Mummery K (2004). Comparison of surveys used to measure physical activity. *Aust N Z J Public Health*; 28(2):128-134.
27. Martinez-Ros MT, Tormo MJ, Navarro C, Chirlaque MD, Perez-Flores D (2001). Extremely high prevalence of overweight and obesity in Murcia, a Mediterranean region in south-east Spain. *Int J Obes;* 25(9):1372-1380.
28. American College of Sport Medicine (1998). The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness, and flexibility in health adults. *Med Sci Sports Exerc*; 30(6):975-991.
29. Brown DW, Bulluz LS, Heath GW, Moriarty DG, Ford ES, Giles WH, Mokdad AH (2003) Association between recommended levels of physical activity and health-related quality of life/findings from the 2001 behavioral risk factor surveillance system (BRFSS) survey. *Prev Med* ; 37(5):520-528.
30. Iacobllis G, Ribaudo MC, Zappaterreno A, Innaucci CV, Leonetti F (2005). Prevalence of uncomplicated obesity in an Italian obese population. *Obes Res*; 13(6):1116-1122.
31. Hu G, Qiao Q, Silventoinen K, Eriksson JG, Jousilahti P, Lindstrom J, Valle TT, Nissinen A, Tuomilehto J (2003). Occupational, commuting, and leisure-time physical activity in relation to risk for Type 2 diabetes in middle-aged Finnish men and women. *Diabetologia*; 46(3):322-329.

Corresponding author
Javad Mehrabani
Faculty of Physical Education and Sport Sciences,
University of Guilan, P.O Box 1438, Rasht, Iran
E-mail: *mehrabanij@gmail.com , mehrabanij@guilan.ac.ir*

Received: July 25, 2017
Accepted: November 10, 201