

Prevalence and Risk Factors of Hypertension in the Urban Population of Iran

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Abstract

Objective: Hypertension is an important cause of cardiovascular diseases. Obesity is one of the factors that effect of cause and prevalence hypertension. The aim of this study is prevalence and risk factors in hypertension in urban in Kerman.

Methods: 5900 population, 3238 women and 2662 men aged 15-75 years. Weight, height, BMI and blood pressure were measured. Pre-hypertension and hypertension were determined as 120-139/80-89 mmHg and >140/90 mmHg for systolic/diastolic blood pressure, respectively.

Results: The prevalence of hypertension regards to the sex of the participants was 21.1% for men and 24% for women (P=0.809) while it was 22.6% for the whole population. The prevalence of obesity was 63.9% for men and 79.0% for women and 30.3% for the whole population. The highest prevalence of obesity was belonged to those who were between 45-54 years. According to regression analysis the chance of having hypertension for those who had a weekly consumption of white grain was 0.3 more than those who consumed it on a monthly basis (p <0.05).

Conclusions: Obesity is related directly to other cardiovascular diseases and mortality due to them. Based on the results of this study, the necessity of modifying nutritional cultures, nutritional education for these patients, weight control method and informing them of the impact of their diet on improving their illnesses are effective, while reducing the over-the-counter costs of clinical treatments for patients and the community.

Keywords: Hypertension; Cardiovascular diseases; Fiber; Brain strokes incidence

Introduction

The prevalence of hypertension disease is increasing in the developing countries. On the Mediterranean area, high blood pressure has affected 26% of the total population. The prevalence of hypertension has been reported about 21.7% in Mediterranean region [1,2]. In the Tehran lipid and glucose study, after balancing for age, the prevalence of hypertension was determined 19.4% in women and 23.3% in men [3] and its prevalence in Kerman was reported 12.1% in 2005-2006. Hypertension disease in the long term leads to irreversible damage to the cardiovascular system, small vessels, and an increased probability of brain strokes incidence [3]. High blood pressure is considered itself as one of the risk factors of cardiovascular diseases.

Many factors such as heredity, environment, salt sensitivity, plasma renin level, insulin sensitivity rate, ions such as sodium, calcium, also age, race, gender, smoking, alcohol, serum cholesterol rate, glucose intolerance, obesity and overweight can have a significant effect on creating hypertension [4].

Obesity is one of the factors that its relationship with blood pressure has been reported in various studies [5-8]. Obesity is a condition in which body fat stores are increased to a degree that causes disorder in one's health [9]. Obesity diagnosis criteria that are generally used in the studies, are using indicators related to weight, special anthropometric measurements such as skin wrinkle thickness (subcutaneous fat thickness defined by the percentiles from 5-95), waist to hip circumference ratio, waist circumference, using special devices and methods for determining body fat and body mass index that is defined by numerical categorization for normal weight (<25), overweight (25-29), and obesity (≥ 30) [10].

For many years, the relationship between hypertension and dietary food patterns has been mentioned. There are different opinions about the relationship between dietary patterns and the prevalence of hypertension due to differences in sex, age and races.

There are few studies in some diet components and hypertension. According to the importance of diet and weight control in hypertension control and according to this fact that the food pattern status in these patients has not been performed so far in Kerman, so, this study reviews food pattern in these patients for the first time in Kerman.

Methods

The first phase of the study known as KERCADRs, which is a population-based cohort study, was initiated from 2009-2011 among 5900 adult subjects aged 15-75 years old in Kerman. Using a non-proportional to size one-stage cluster sampling household survey, the study samples were recruited. The study protocol of the study was approved by the Ethics Committee of the Kerman University of Medical Sciences (Ethic code 88/110 KA). An informed consent to

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participate was given by all subjects' prior participation in the study. The inclusion and the exclusion criteria was the age of the participants which include those who are between 15-75 years and exclude those who were under 15 and above 75 years old.

Data gathering tool

Each subject was seated in a quiet and comfortable position for 5 min and BP was measured, 5 min apart with a mercury sphygmomanometer (cuff size 12.5 cm × 40 cm) with auscultator method of BP measurement.

a) Interview: Every participant was interviewed by a trained questioner in order to gather data. Furthermore, a trained doctor reviewed different risk factors of coronary heart disease and measured blood pressure. Data related to the present study including demographic data (age and gender and height and weight) and education level (illiterate, primary to high school and high school and higher) were gathered. Getting food was gathered and recorded by FFQ questionnaire that its reliability and validity have been measured. This questionnaire was used to evaluate the consumption of food groups. The consumption of food groups was placed in two food patterns of meats-fats-sugars and cereals-vegetables-fruits and was evaluated. Frequency of use was categorized into weekly and monthly.

b) Blood pressure definition: Blood pressure was evaluated by a doctor and by using the mercury sphygmomanometer and after at least 5 min rest. This blood pressure was evaluated for the second time (at least after 30 min interval) by using right hand's arm and in sitting position. Finally, the average of evaluation for two times was considered as diastolic and systolic blood pressure. In addition to blood pressure measuring, the patients were asked about previous record of hypertension disease and the ones who received anti-hypertension drug were also considered among the patients who had hypertension. Data were analysed using STATA12. Regression analysis was used to demonstrate the relation between food groups and the blood pressure.

Results

The prevalence of hypertension in the whole studied population was 22.6% and the above prevalence regards to the sex of the participants was 21.1% for men and 24% for women while was not significant (P=0.809). Table 1 shows the prevalence of hypertension in different age groups. The prevalence of obesity in patients with hypertension was 30.3% which regards to the sex of the participants it was 63.9% for men and 79.0% for women. The prevalence of obesity in different age groups of 15-24, 25-34, 35-44, 45-54, 55-64 and 65-74 years were 27.3%, 73.1%, 78.3%, 84.1%, 74.5% and 66.1% respectively.

S. No.	Age groups	Blood pressure		P value
		Don't have	Have	
1.	15-24	801	11	<0.0001
	Percent	98.6%	1.4%	
2.	25-34	1043	26	
	Percent	97.6%	2.4%	
3.	35-44	957	93	
	Percent	91.1%	8.9%	
4.	45-54	907	296	
	Percent	75.4%	24.6%	
5.	55-64	537	483	
	Percent	52.6%	47.4%	
6.	65-74	229	315	
	Percent	42.1%	57.9%	

Table 1: The prevalence of hypertension in different age groups.

Table 2 shows the prevalence of overweight and obesity in patients with high blood pressure on order to their gender and different group ages. The results show that among all group ages those who never consumed low-fat and high-fat dairy, red meat, whole grains, white grains, solid oils, butter and cream and sweets, had the highest frequency of usage among participants. Daily use for salt and fruits and weekly use for vegetables, nuts, drinks and fried foods were reported as groups with the highest frequency of usage among participants.

Table 3 shows the frequency of food groups' consumption in both genders in different ages. The predictive food factors of blood pressure have been also reviewed in the conducted evaluations in this research. After adjusting for potential confounding variables, the chance of having hypertension for those who had a weekly consumption of white grain was 0.3 (p <0.05) more than those who consumed it on a monthly basis. That is, the average weekly consumption of white grains increases the risk of developing blood pressure relative to the monthly consumption of this food group. In our study, the monthly consumption of legumes relative to weekly consumption or non-consumption of this group of foods reduces the risk of high blood pressure by 0.6 times.

Discussion

In this study, the prevalence of obesity in hypertension population was 30.3%. There are various studies about the relationship between obesity and increased blood pressure. The results of some studies have showed a significant relationship between obesity and hypertension. These studies have important implications on community health, since hypertension in childhood can be associated with an increased risk of cardiovascular disease at older ages in Mexico that was conducted on Mexican 8-10 years old children who had low socioeconomic status showed the prevalence of high blood pressure [11,12]. The results of a research by Gopinath et al. showed a strong relationship between fat tissue and BP during childhood [13].

In Iran, the obtained results from Mazloom's study on high blood pressure patients showed the high prevalence of obesity in them [14]. In our study, a significant relationship was found between obesity and blood pressure. The prevalence of obesity in women with high blood pressure was more than men and in the age group of 45-54 years was more than the other age groups. One of the most important effective factors on the increased blood pressure is food and nutrition pattern of people. The obtained data from statistical analysis in our study showed that unhealthy food pattern including no daily consumption of vegetables (raw and cooked), nuts, low fat dairy, white grains and weekly consumption of fried foods has been reported in majority of this population. Vegetables and fruits are one of the most sources of vitamins, minerals and fiber. Recommendation of food pyramid for daily consumption of vegetable is 3-5 units and for fruits is 2-3 units. Various studies have been conducted about the importance of

Genders and age groups	Percentage	P value
Men	9.3%	<0.0001
Women	16.9%	
15-24	5.6%	<0.0001
25-34	11.5%	
35-44	18.7%	
45-54	24%	
55-64	23%	
65-74	17.6%	

Table 2: The prevalence of obesity based on body mass index in both genders and age groups.

Food groups	Genders and age groups	Never	Monthly	Weekly	Daily	P value
Fruits	Men	2.2%	1.1%	33.2%	63.5%	<0.0001
	Women	4.2%	2.1%	35.5%	58.2%	
	15-24			40.0%	60.0%	<0.0001
	25-34	3.8%	3.8%	42.3%	50.0%	
	35-44	2.2%	2.2%	35.5%	60.2%	
	45-54	4.5%	1.7%	31.7%	62.1%	
	55-64	3.1%	1.3%	33.3%	62.3%	
65-74	2.6%	2.3%	34.0%	61.2%		
Vegetable	Men	17.4%	6.1%	64.0%	12.4%	<0.0001
	Women	21.4%	7.6%	56.3%	14.6%	
	15-24	20.0%	10.0%	50.0%	20.0%	<0.0001
	25-34	11.5%	11.5%	73.1%	3.8%	
	35-44	10.8%	5.4%	72.0%	11.8%	
	45-54	14.5%	6.1%	64.2%	15.2%	
	55-64	20.6%	6.4%	57.2%	15.8%	
65-74	21.9%	7.3%	59.7%	11.1%		
High fat dairy	Men	98.4%	0%	50%	0.5%	<0.0001
	Women	98.3%	0.1%	1.2%	0.4%	
	15-24	81.8%			18.2%	<0.0001
	25-34	100.0%		1.1%		
	35-44	98.9%		3.1%		
	45-54	96.2%		0.6%		
	55-64	99.4%		0.3%		
65-74	99.0%					
Low fat dairy	Men	96.5%		0.6%	2.9%	<0.0001
	Women	95.5%		0.6%	3.9%	
	15-24	100.0%				<0.0001
	25-34	96.0%				
	35-44	98.8%			1.2%	
	45-54	96.8%		0.8%	2.4%	
	55-64	94.4%		1.0%	4.6%	
65-74	95.3%		0.4%	4.4%		
Whole grain	Men	96.7%	0.0%	0.0%	3.3%	<0.0001
	Women	95.8%	0.2%	0.2%	3.9%	
	15-24	100.0%				<0.0001
	25-34	100.0%			4.8%	
	35-44	95.2%			3.2%	
	45-54	96.8%			5.3%	
	55-64	94.4%	0.2%	0.4%	2.6%	
65-74	97.1%	1.0%	0.6%	1.3%		
White grain	Men	97.1%	2.3%	0.9%	1.1%	<0.0001
	Women	95.7%	-	-		
	15-24	100.0%				<0.0001
	25-34	95.8%		4.2%		
	35-44	91.5%	2.4%	6.1%		
	45-54	96.3%	1.6%	0.4%	1.6%	
	55-64	96.5%	2.5%	0.3%	0.8%	
65-74	97.0%	1.5%	0.4%	1.1%		
Fried foods	Men	14.2%	5.9%	59.5%	20.4%	<0.0001
	Women	20.6%	8.9%	57.3%	13.2%	
	15-24			81.8%	18.2%	<0.0001
	25-34	11.5%		46.2%	42.3%	
	35-44	9.7%	5.4%	54.8%	30.1%	
	45-54	13.5%	7.1%	58.4%	20.9%	
	55-64	19.5%	7.7%	56.3%	16.4%	
65-74	21.3%	9.6%	61.8%	7.3%		

Butter and cream	Men	89.2%	0.0%	10.1%	0.7%	<0.0001
	Women	94.4%	0.1%	4.9%	0.5%	
	15-24	90.0%		10.0%		<0.0001
	25-34	88.5%		11.5%		
	35-44	82.8%		16.1%		
	45-54	86.8%		11.9%		
	55-64	94.8%		4.6%		
	65-74	94.6%		5.1%		
		91.7%		7.5%		
Fats	Men	70.3%	1.2%	15.9%	12.6%	<0.0001
	Women	63.3%	0.7%	15.6%	20.4%	
	15-24	50.0%		25.0%	25.0%	<0.0001
	25-34	79.2%		4.2%	16.7%	
	35-44	61.7%	2.5%	16.0%	19.8%	
	45-54	54.5%	1.2%	20.8%	23.5%	
	55-64	71.0%	1.0%	14.9%	13.2%	
	65-74	70.7%	0.4%	13.8%	15.2%	
Salt	Men	32.6%	2.0%	5.6%	59.8%	<0.0001
	Women	33.4%	0.5%	4.8%	61.2%	
	15-24	18.2%		18.2%	63.6%	<0.0001
	25-34	19.2%		3.8%	76.9%	
	35-44	26.1%	1.1%	6.5%	66.3%	
	45-54	31.6%	1.0%	5.4%	61.9%	
	55-64	31.7%	1.0%	5.0%	62.3%	
	65-74	38.3%	1.3%	5.1%	55.3%	
Drinks	Men	55.5%	15.4%	27.1%	2.0%	<0.0001
	Women	64.6%	15.0%	18.4%	1.9%	
	15-24	30.0%	30.0%	40.0%		<0.0001
	25-34	30.8%	15.4%	46.2%	7.7%	
	35-44	45.2%	15.1%	35.5%	4.3%	
	45-54	55.6%	15.6%	26.4%	2.4%	
	55-64	66.4%		18.7%	1.5%	
	65-74	65.3%	13.5%	17.8%	1.3%	
			15.6%			
Nuts	Men	27.4%	24.3%	40.8%	7.4%	<0.0001
	Women	34.4%	22.8%	35.2%	7.6%	
	15-24		50.0%	33.3%	16.7%	<0.0001
	25-34	16.0%	20.0%	52.0%	12.0%	
	35-44	25.3%	21.7%	43.4%	9.6%	
	45-54	26.2%	23.8%	45.2%	4.8%	
	55-64	30.1%	24.0%	37.2%	8.8%	
	65-74	37.1%	23.2%	32.4%	7.4%	
Sweets	Men	73.1%	0.0%	5.4%	21.5%	<0.0001
	Women	84.9%	0.1%	3.8%	11.2%	
	15-24	54.5%		36.4%	9.1%	<0.0001
	25-34	80.8%		3.8%	15.4%	
	35-44	76.3%		4.3%	18.3%	
	45-54	76.2%		6.1%	17.7%	
	55-64	82.3%		3.5%	14.1%	
	65-74	81.5%		3.8%	14.6%	
Meats	Men	468(95.5%)	1(0.2%)	19(3.9%)	2(0.4%)	<0.0001
	Women	95.2%	0.5%	3.8%	0.6%	
	15-24	100.0%				<0.0001
	25-34	96.0%		4.0%		
	35-44	96.4%		3.6%		
	45-54	95.2%	0.8%	2.8%	1.2%	
	55-64	95.1%	0.2%	4.4%	0.2%	
	65-74	93.8%	0.4%	5.4%	0.4%	

Rice and spaghetti	Men	46.0%	-	32.3%	21.7%	<0.0001
	Women	46.7%	-	31.4%	21.9%	
	15-24	16.7%	-	66.7%	16.7%	<0.0001
	25-34	12.0%	-	48.0%	40.0%	
	35-44	22.9%	-	37.3%	39.8%	
	45-54	37.3%	-	35.3%	27.3%	
	55-64	49.8%		29.9%	20.4%	
65-74	57.1%		28.0%	14.9%		
Legumes	Men	25.4%	6.1%	68.2%	0.2%	<0.0001
	Women	34.4%	8.9%	56.0%	0.6%	
	15-24	33.3%		66.7%		<0.0001
	25-34	20.0%		80.0%		
	35-44	18.1%	6.0%	74.7%	1.2%	
	45-54	30.9%	7.2%	61.0%	0.8%	
	55-64	30.1%	7.5%	61.9%	0.5%	
65-74	30.3%	9.9%	59.9%			
Fast foods	Men	73.0%	16.8%	9.7%	0.5%	<0.0001
	Women	76.3%	15.5%	8.1%	0.1%	
	15-24	9.1%	63.6%	18.2%	9.1%	<0.0001
	25-34	42.3%	19.2%	38.5%		
	35-44	51.6%	24.7%	22.6%	1.1%	
	45-54	69.6%	20.5%	9.6%	0.3%	
	55-64	76.5%	16.0%	7.3%	0.2%	
65-74	84.0%	10.6%	5.4%			

Table 3: The frequency of food groups' consumption in both genders in different ages.

vegetables consumption as a fiber source in controlling and preventing of blood pressure [14-16].

A study in Iran by Rohani et al. showed that diet with low glycemic index (vegetables have low glycemic index) has no effect on obesity and blood pressure [17]. In our study, daily consumption of fried foods increased the probability of high blood pressure incidence, 0.4 times more than monthly consumption of these foods. Our study confirmed of the result of S. Eilat-Adar study [14].

In a study, Iran has been reported as the first rank in using solid vegetable oil in the Middle East. This study states that the annual consumption of beverages in Iran is 42 liters, while in the world is 12-10 liters [17,18].

Another study Van Maijl et al. found that, daily intake of low-fat dairy products reduced the systolic blood pressure for 8 weeks in obese subjects, but did not improve other risk factors that caused the metabolic syndrome [19]. In the evaluations conducted in our survey, the nutritional factors predictive of blood pressure have also been studied. According to our study, the weekly consumption of white cereals increased by 0.3 times the monthly intake of blood pressure. A study in 2008-2010, high intake of fiber and vitamins can have protective effects against hypertension [15].

Legumes are sources of fiber richness and, on the other hand, they are considered as the source of plant proteins. There are some studies that showed increasing of fiber intake from whole grains and legumes is associated with a reduction in the incidence of hypertension [15,19]. In our study, the monthly consumption of legumes compared with weekly intake or non-consumption of this group of foods reduces the risk of high blood pressure by 0.6 times. The result of our plan was inconsistent with the result of some surveys. Nuts (pistachio, almond, walnut and etc.) are considered as rich sources of essential fatty acids, PuFA and fiber in diet. This food group has especial value in all ages' diet. The recommendation of food pyramid is daily consumption of this food group.

A study by Mirmiran showed that low intake of fruits and nuts increased hypertension incidence [20]. In our study, the majority of the hypertension participants reported weekly consumption of the nuts, that it increased the risk of developing blood pressure by 0.7 times more than monthly consumption. This is likely due to the fact that in our country the consumption of the nuts is soaked in salt. It probably the added salt to the nuts has increased the likelihood of elevated blood pressure. Modifying unhealthy dietary habits include low or non-consuming fatty and salty foods, high fruits and vegetables intakes, eating healthy snacks, low or non-consuming of sweets, making suitable use of fish can be a preventative factor for cardiovascular disease [20]. In our study, the majority of people reported weekly consumption of fried foods and daily intake of salt, while consumption of sweets, fast food, fats, and high-fat dairy products was not reported by the majority of the population. Also in our study, the results showed that daily sweets intake in comparison with monthly intake increased hypertension incidence by 2.2 times ($p < 0.05$). Payab et al. showed that consuming sweets and sweet drinks is related significantly to anthropometry and blood pressure of the participants in some studies [21]. In our study, daily consumption of drinks can increase the chance of high blood pressure by 0.6 times more than monthly intake ($P < 0.05$). Furthermore, based on our study, weekly consumption of fast foods increased the risk of high blood pressure incidence by 0.7 times more than monthly consumption. A study by S. Eilat-Adar and colleagues showed that unhealthy dietary patterns involved, high consuming of high energy foods, saturated fatty acids, animal fats, high intake of sweets and sweets drinks reduced the fruits and vegetables intake. Increased consumption of fast foods had a direct relationship with CVD risk factors [14]. Thus, it appears that the results obtained from our plan, except in few cases, are consistent with many of the results of other initiatives in our country and in other countries, that these emphasize the observance of a healthy diet to prevent or control high blood pressure.

Conclusion

Obesity is related directly to other cardiovascular diseases and mortality due to them. Based on the results of this study, the necessity of modifying nutritional cultures, nutritional education for these patients, weight control method and informing them of the impact of their diet on improving their illnesses are effective, while reducing the over-the-counter costs of clinical treatments for patients and the community.

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