

Relationship between blood pressure and physical activity in adults 20 to 65 years old

Relación entre la presión arterial y la actividad física en adultos de 20 a 65 años

Relação entre pressão arterial e atividade física em adultos de 20 a 65 anos

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Abstract

A healthy diet, physically active lifestyle and maintaining normal weight constitute the cornerstones of prevention of several chronic diseases. The objective of this study is to determine the relationship between physical activity, Consumption of fruits and vegetables, high blood pressure. In this descriptive-analytical study, 1452 citizens (744 men and 708 women) in Sabzevar (Khorasan Razavi Province) aged between 20 to 65 years old were randomly selected in 2016. The population completed the International Physical Activity Questionnaire (IPAQ) and their systolic and diastolic blood pressure was measured using a Digital Blood Pressure Monitor. Details of the nutritional status of the subjects under sex. SPSS software was used to analyze data. In the present study, the dairy consumption of the majority of people (48.1%) had a share of dairy consumption per day (milk and yogurt, cheese, cream and cheese), and 46.9% of the subjects were less than one

Resumen

Una dieta saludable, un estilo de vida físicamente activo y mantener un peso normal constituyen las piedras angulares de la prevención de varias enfermedades crónicas. El objetivo de este estudio es determinar la relación entre la actividad física, el consumo de frutas y verduras, la presión arterial alta. En este estudio analítico descriptivo, 1452 ciudadanos (744 hombres y 708 mujeres) en Sabzevar (provincia de Khorasan Razavi) de 20 a 65 años de edad fueron seleccionados al azar en 2016. La población completó el Cuestionario Internacional de Actividad Física (IPAQ) y su sistólica y la presión arterial diastólica se midió utilizando un monitor digital de presión arterial. Detalles del estado nutricional de los sujetos bajo sexo. Se utilizó el software SPSS para analizar los datos. En el presente estudio, el consumo de lácteos de la mayoría de las personas (48,1%) tuvo una proporción del consumo de lácteos por día (leche y yogur, queso, crema y queso), y el

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share per day Dairy products. This study revealed that the level of physical activity is low in 46.2% of men and 44.2% of women that is less than 600 MET per week. In addition, 0.059% of the total population suffered from systolic blood pressure above 140 mm Hg and 10% of the total population had a diastolic blood pressure above 90 mm Hg.

Keywords: Physical activity, blood pressure groups, adults, consumption of fruits and vegetables

46,9% de los sujetos fue menos de una acción por día. Productos lácteos. Este estudio reveló que el nivel de actividad física es bajo en el 46.2% de los hombres y el 44.2% de las mujeres, que es menos de 600 MET por semana. Además, el 0,059% de la población total sufría de presión arterial sistólica por encima de 140 mm Hg y el 10% de la población total tenía una presión arterial diastólica por encima de 90 mm Hg.

Palabras claves: Actividad física, grupos de presión arterial, adultos, consumo de frutas y verduras.

Resumo

Uma dieta saudável, estilo de vida fisicamente ativo e manter o peso normal constituem os pilares da prevenção de diversas doenças crônicas. O objetivo deste estudo é determinar a relação entre atividade física, consumo de frutas e hortaliças, hipertensão arterial. Neste estudo descritivo-analítico, 1452 cidadãos (744 homens e 708 mulheres) em Sabzevar (província de Khorasan Razavi) com idade entre 20 e 65 anos foram selecionados aleatoriamente em 2016. A população completou o Questionário Internacional de Atividade Física (IPAQ) e sua sistólica. e a pressão arterial diastólica foi medida usando um monitor digital de pressão arterial. Detalhes do estado nutricional dos sujeitos em sexo. O software SPSS foi utilizado para analisar dados. No presente estudo, o consumo de lácteos da maioria das pessoas (48,1%) teve uma participação no consumo de produtos lácteos por dia (leite e iogurte, queijo, creme e queijo) e 46,9% dos participantes tinham menos de uma ação por dia. Laticínios. Este estudo revelou que o nível de atividade física é baixo em 46,2% dos homens e em 44,2% das mulheres que é inferior a 600 MET por semana. Além disso, 0,059% da população total sofria de pressão arterial sistólica acima de 140 mmHg e 10% da população total tinha pressão arterial diastólica acima de 90 mmHg.

Palavras-chave: Atividade física, grupos de pressão arterial, adultos, consumo de frutas e legumes.

Introduction

Hypertension is a global, non-communicable chronic disease and is largely asymptomatic. Known as the silent killer, a person experiences very few signs and symptoms until damage occurs to a target organ. Hypertension is a common condition in South Africa and is a risk factor for cerebrovascular incidents, myocardial infarction, left ventricular hypertrophy, renal disease and retinopathy (Steyn et al., 2001). Hypertension is a main cause of heart disease such as atrial fibrillation, heart and brain stroke, congestive heart failure and renal failure (Choudhury & Lip, 2005). About 25% of adults in the world suffer from hypertensive (Baghianimoghadam et al., 2010). This is while a significant part of this group are unaware of their illness and do not seek treatment. Among suffers who are aware of their illness, a small percentage are seeking control it, and statistics shows that the degree of successful control is low (Pickering,

2001; Baghianimoghadam et al., 2011). Controlling a systolic blood pressure of 140 mmHg or less reduces the probability of a brain stroke from 28 to 44% and heart attack from 20 to 35% (Temple et al., 2012).

One way to control blood pressure is regular physical activity. Regular physical activity reduces hypertension, total cholesterol and triglycerides (Drygas et al., 2000; Abbott et al., 1997). It also reduces hypertension in people with low to moderate hypertension (Kim et al., 2001). As a result, regular physical activity is a non-pharmacological method helping control hypertension (Lee et al., 2003). However, a study conducted in Tehran revealed that 80% of men and 85% of women have low level of physical activity, they do not have regular walking and have only insufficient routine physical activity (Rockwood & Middleton, 2007).

The factors responsible for these protective effects include: antioxidants and Other nutrients like flavonoids, carotenoids, vitamin C, acid (10.9) So get the values Folic and also fiber foods Sufficient fruits and vegetables can be part of a healthy diet an important role in preventing chronic non-chronic diseases and factors Have a risk.

Regular physical activity is so important that it is the fourth most-commonly risk factor in the world, causing the highest mortality rate (i.e. about 6%) (WHO ,2009). It also causes high blood pressure, 30% of cardiovascular disease, increased blood glucose (27% of diabetes cases), obesity, about 21 to 25% of breast and intestinal cancers (Heyward & Gibson, 2014; Alwan et al., 2010).

In other words, low levels of physical activity can cause 6 to 10% of most chronic non-contagious diseases such as heart disease, type 2 diabetes, colon cancer, and breast cancer. It is also estimated that regular physical activity increases life expectancy up to 68% (Fakhrzadeh et al., 2016). According to the World Health Organization, low physical activity is the main risk factor for about 17% of diabetes and heart disease, and 10% of breast and colon cancers (Fakhrzadeh et al., 2016). An average of 150-min physical activity per week reduces the risk of cardiovascular diseases up to 30%, colon and breast cancer by 21% to 25% causes, and diabetes by 27%. Physical activity also reduces the risk of brain stroke, hypertension, depression and dementia (Turconi et al., 2008).

According to the World Health Organization, an average of 35.7% of population (25.2% male and 46.5% female) in Iran had low level of physical activity in 2010 (WHO, 2011). Based on a systematic study, 30 to 70 percent of population in Iran had low level of or no physical activity in 2016 (Fakhrzadeh et al., 2016). It should be noted that in this study, people who do not have 30 minutes moderate physical activity at least 5 days per week or 20 minutes intense physical activity at least 3 days per week (or a combination of both), in which the energy cost by physical activity is less than 600 metabolic equivalents per week, were considered as people with no physical activity (Hallal et al., 2012).

Since no study was conducted on the relationship between physical activity and hypertension of adults as well as the related factors in Sabzevar,

the objective of this study was to determine the relationship between physical activity, facilitators, barriers as well as the systolic and diastolic blood and the underlying factors in Sabzevar, Khorasan Razavi province in the east of Iran, for the age group of 20 to 65 years old.

Method of Analysis

This is a descriptive-analytical research. 1452 citizens (744 men and 708 women) in Sabzevar (Khorasan Razavi Province) aged between 20 to 65 years old who were willing to cooperate were selected. Samples were gathered by cluster sampling where clusters were randomly selected and questionnaires were filled during in-person visits.

After deciding the number of samples for each center, the volunteers collected data for all the family members who were between 20 and 65 years through in-person visits. When the health volunteers (trained by the researcher) completed the questionnaires, they were interviewed in-person and face-to-face during which their blood pressures were measured in two rounds (by Beurer blood pressure monitor).

To measure blood pressure, people were asked to sit in a comfortable position and after a 5-minute rest, the blood pressure was measured twice by a digital monitor (with a two-minute lag) in the right arm. High blood pressure is defined as a blood pressure higher than 140 mmHg and diastolic blood pressure higher than 90 mmHg, according to the Ministry of Health and Medical Education. Measuring and recording the blood pressure was repeated after 5 minutes by the volunteers.

Three groups to be mentioned.

Ethical considerations in this study included maintaining human dignity as a fundamental ethical principle in the research; the information of the studied population was kept fully confidential and the participants were ensured. Several sessions were held for executive coordination with authorities at the Sabzevar health center. Written informed consent form was filled by participants in the study.

This research was approved by the Ethics Committees of Medical Sciences in University of Hamedan and University of Sabzevar and has received the Code of Ethics. This study was financed by the two mentioned universities. The university ethics code number is IR.UMSHA.REC.1394.217.

Sampling Method and Statistical Analysis

The sample number is calculated using the following relationship:

$$n = \frac{z_{1-\frac{\alpha}{2}}^2 (p)(1-p)}{(d)^2}$$

Where $p=33\%$ and an error rate is 5% ($1-\frac{\alpha}{2} = 0.95$). Considering the relative error equal to 10% , the number of samples will be

1200. We selected 1452 samples considering the effect of the sampling plan. Chi-square test was used to examine the relationship between variables in the contingency tables at the error level of 0.5.

Findings

According to current research findings, 744 (51.2%) male and 708 (48.8%) female subjects were included in this study whose mean age was 36.83 ± 10.53 .

Table 1. Number and rate of demographic characteristics of the subjects

Gender	Male	744	51.2
	Female	708	48.8
Age	27-17	258	18.9
	38-28	630	43.8
	39-49	373	25.9
	60-40	155	10.8
	>60	23	1.6
	Illiterate	50	3.4
Education	Elementary	268	18.5
	Guidance school	227	15.6
	Diploma	494	34.0
	Associate degree	248	17.1
Marital status	B.A	165	11.4
	Single	106	7.3
	Married	1311	90.4
	Divorced	20	1.4
	Widowed	14	1.0

Table 1 indicates number and rate of demographic characteristics of the subjects studied in this research. As regards, the majority were male ($n=744$, 51.2%). The subjects aged between 28-38 had the highest frequency ($n=630$, 43.4%). The highest and lowest levels

of education were diploma ($n=494$, 34.0%) and illiterate ($n=50$, 3.4%), respectively. Also, regarding marital status, married ($n=1311$, 90.3%) and widowed ($n=14$, 10%) participants had the highest and lowest frequency.

Table 2. Details of the nutritional status of the subjects under sex

P-Value	Women		Men		Variables
	Percentage	amplitude	Percentage	amplitude	
8.13 0.017	2.4	17	0.7	5	Less than 5 shares per day
	1.1	8	1.7	13	6-5 shares per day
	96.5	683	92.2	723	7 shares and more per day
	0	0	0	0	4 shares and more per day
					Meat

0.519	0.1	1	0.3	2	3 shares per day	
	99.9	707	99.7	742	2 shares and less per day	
	83.2	589	86.3	642	Less than 2 shares per day	
2.70	12.3	87	10.1	75	2-3 shares per day	vegetables
0.529	4.5	32	3.6	27	4 shares and more per day	
	54.7	387	65.2	485	Less than 2 shares per day	
19.71	38.6	273	27.7	206	2-3 shares per day	Fruit
<0.001	6.8	48	7	52	4 shares and more per day	
	47.5	336	46.6	345	Less than 1 share per day	
0.27	47.5	336	48.8	363	1 share per day	dairy
0.874	5.1	36	4.8	36	2 shares and more per day	
	4.4	31	4.8	36	Less than 2 shares per day	
12.80	25	177	24.9	185	2-3 shares per day	Nuts and beans
0.769	70.6	500	70.2	522	4 shares and more per day	
	0	0	0	0	8 shares and more per week	
	0	0	0	0	7-6 shares in seven	Sweets
	100	708	100	744	5 shares and less per week	

Chi-square test statistics / Fisher exact statistics

Fischer's exact test was used for meat consumption and the Chi-square test was used for the rest of the diet. For the variable of consumption of cereal intake in male and female sexes, most people in the 7th grade and more were on the day off, and the frequency of classes differed according to gender. For the meat consumption intake of the two sexes, most people on the second floor did not have enough time per day and on the fourth floor and more per day for both sexes. The frequency difference between classes was not significant in terms of sex. In the variable of nutrition consumption, vegetable in the two sexes is the most frequent in the class less than 2 shares per day, and the frequency difference between classes is not significant in terms of sex. In the male fecundity, the majority of people in the less than 2% share of the day were 485 (65.2%) later in the second to the second stage (206 (27.7%)) and in the female sex most people on the lower floor From 2 participations on day 387 (54.7%) and then on the second floor, the share was 273 days (38.6%), and the frequency difference of the classes was significant in terms of gender. In the

male dairy consumption variable, the majority of people in the 1st grade share on day 363 (48.8%) and then in the less than 1 share on day 345 (46.4%) and in the female sex most people in less than 1 Share in the day and 1 share in the day, and the difference in the number of classes in terms of sex is not significant. In the variable of nutrition consumption of nuts and legumes in both males and females, most people are on the fourth floor and more in the day. In the nutritional consumption variable, all two sexes were on the fifth floor and less per week. According to the results of the above table, the frequency of classes in two sexes in all variables, except for the consumption of cereals and fruits, are matched.

In the present study, the dairy consumption of the majority of people (48.1%) had a share of dairy consumption per day (milk and yogurt, cheese, cream and cheese), and 46.9% of the subjects were less than one share per day Dairy products. This shows that dairy consumption in half of our population is lower than the recommended dietary standard.

Table 3: Blood pressure status of the study subjects divided by gender

Variable			Male		Female		Total		Test statistic
			Frequency	%	Frequency	%	Frequency	%	P-Value*
Systolic Blood Pressure	Normal	<120	468	62.9	471	66.5	939	64.7	12.44
	Pre-hypertension	120-139	242	32.5	185	26.1	427	29.4	
	Hypertension (stage 1)	140-159	33	4.4	46	6.5	79	5.4	
	Hypertension (stage 2)	≥160	1	0.1	6	0.8	7	0.5	
Diastolic Blood Pressure	Normal	<80	471	63.6	465	65.7	936	64.5	0.7
	Pre-hypertension	80-89	196	26.3	175	24.7	371	26.5	
	Hypertension (stage 1)	90-109	56	7.5	53	7.5	109	7.5	
	Hypertension (stage 2)	110≥	21	2.8	51	2.1	36	2.5	

*: Chi-square test statistics

Table 2 shows blood pressure status of the study subjects divided by gender. A total of 5.9% of the population had a systolic blood pressure above 140 mm Hg and 0.10% of the total population had diastolic blood pressure above 90 mm Hg. In men population, 4.5% had a systolic blood pressure above 140 mmHg and 10.3% had a diastolic blood pressure above 90 mmHg. In women population, 7.3% had a systolic blood pressure above 140 mmHg, and

9.6% had a diastolic blood pressure above 90 mm Hg. For both systolic and diastolic blood pressure in both sex groups, most subjects had a normal blood pressure. For systolic blood pressure, the frequency in both genders was significant ($p=0.006$). The percentage of systolic hypertension (both stages 1 and 2) is higher in women than in men: 7.3% in women, and 4.5% in men. This is while the percentage of systolic hypertension is higher in men than women: in men, 32.5% and in women, 26.1%.

Table 4: Blood pressure status of the study subjects divided by physical activity

Variable			Low		Low-Medium		High-Medium		High		Test statistic
			No	%	No	%	No	%	No	%	P-Value*
Systolic Blood Pressure	Normal	<120	422	64.2	240	63.7	223	67.6	54	61.4	7.42
	Pre-hypertension	120-139	204	31.1	111	29.4	83	25.2	29	33.0	
	Hypertension (stage 1)	140-159	28	4.3	24	6.4	22	6.7	5	5.7	
	Hypertension (stage 2)	≥160	3	0.5	2	0.5	2	0.6	0	0	
Diastolic Blood Pressure	Normal	<80	410	62.4	252	66.8	217	65.8	57	64.8	13.54
	Pre-hypertension	80-89	190	28.9	92	24.4	70	21.7	19	21.6	
	Hypertension (stage 1)	90-109	42	6.4	25	6.6	32	9.7	10	11.4	
	Hypertension (stage 2)	110≥	15	2.3	8	2.1	11	3.3	2	2.3	

*: Chi-square test statistics

Table 3 shows blood pressure status of the study subjects divided by physical activity. For two variables of systolic and diastolic blood pressure in different classes of physical activity, most people had a normal blood pressure. For both blood pressure variables, there is no significant difference in the level of physical activity in different classes. From the insignificance difference for two blood pressure variables, we can conclude that the different classes are in the same level of physical activity. As table above shows, 4.3% of people with low physical activity have hypertension stage one and 6.4% of people with low-medium physical activity are hypertensive.

Discussions

These results are consistent with those from observational studies of other cardiovascular diseases. Fung et al (2008) found statistically significant associations between a diet score determined from the ranking of DASH diet components and the incidence of coronary heart disease and stroke (Fung et al., 2008). Although the associations did not reach statistical significance, a trend was found toward lower rates of incident hypertension, coronary heart disease mortality, stroke mortality, and cardiovascular mortality associated with a DASH diet score determined from the food and nutrient recommendations in a study by Folsom et al (2007). The positive points of the analyzed studies include the use of randomized clinical trials, which is an appropriate methodology to assess the effects of an intervention; large sample sizes; long-term follow-up; and suitability of the statistical analyses (Folsom et al., 2007). Consequently, the majority of the studies found a significant evolution in the stages of action and maintenance in the participants, in addition to changes in the behaviors associated with HEH and PA, with significant differences among the intervention and control groups.

The amount of fruit consumed in the population under study was less than two parts per day, which could be due to the high price of fruit. The consumption of vegetables and salads in the population under study was less than the standard, that is, less than two portions per day. In terms of cereal consumption (bread, rice and macaroni) in the studied population, 97 percent of the 7 percent and more of the daily intake of cereals were used by Safari and his colleagues in 2006 in a population of 167 people. The amount

of cereal consumption was 5 / 69% were obtained (Safari et al., 2014).

According to this study, 2% of samples in the age group of 17-27 years old, 5.4% in the age group of 28-38 years, 7.7% in the age group of 39-49 years old, 10.3% in the age group of 50-60 years old, and 8.7% of samples over 60 years old have hypertension.

Most studies show that the average blood pressure increases with age. In the present study, this upward trend is also visible. Systolic blood pressure increased from 5.4% to 7.7% from the third decade to the sixth decade, and diastolic blood pressure increased from 7.7% to 16.4% from the third decade to the sixth decade. The same result was obtained in a study conducted in Tabriz. That is, with increasing age, the systolic blood pressure also increases (Fattahi& Ghandchilar,2000).

According to the results of this study, there is a significant correlation between age and systolic and diastolic blood pressure. This is in accordance with the findings of Abed et al. (2013): a case study on 240 samples (120 in control group and 120 in experimental group) in the Gaza Strip. Data was collected using a questionnaire including social data, lifestyle, and health specifications. The results showed that the most common risk factors for high blood pressure include physical inactivity, obesity (67.5% vs. 92.2%), diabetes (19.2% vs. 7.5%), and smoking (15.5% vs. 1%). The most common uncontrollable risk factors include age and family background (58.8% vs. 71.7%). The results also revealed that many identified high risk factors can be prevented (Abed & Abu-Haddaf, 2013).

In the current study, there was no significant correlation between the level of education and the level of physical activity. These results are consistent with the findings of Qarlipour et al. They also did not find any significant correlation between the level of education and the level of physical activity (Gharlipour et al., 2011).

This increase in blood pressure with age may also be due to weight gain and obesity, as many studies have proven the effect of obesity on hypertension. For example, Heidari and Najjar in a study aimed at comparing lifestyle in people with hypertension found that 77.5% of people with hypertension had overweight and obesity (Najjar& Heidari,2004).

The findings of this study are based on findings Ayşegül Uludağ There is a significant correlation between high blood pressure and obesity (Uludag, 2016).

In order to prevent hypertension, people must have at least 30 minutes of moderate physical activity at least 5 days a week, or at least 20 minutes of vigorous physical activity for at least 3 days a week (Haskell et al., 2007).

The prevalence of pre-hypertension is 27.9% and 25.2% in the two age groups of 28-38 and 17- 27 years old, respectively. This is while in the age group of 39-49 years old, pre-hypertension increased by 34% and in the group over 60, it reached to 43.5%. It means that, pre-hypertension rate is higher in older adults than younger ones. For systolic blood pressure, the different in frequency for different age classes is significant. We conclude from this significance that age groups are not the same. This finding is consistent with many other studies suggesting that the prevalence of hypertension is directly correlated to age (Chow et al., 2013).

According to a Canberay study conducted in 2011 Systolic and diastolic blood pressure begins to increase with age (Güçlü al., 2012).

According to the results of this study, the rate of physical activity in women is lower than that of men, according to Alireza Soltanian et al. (Soltanian et al., 2011).

In this study, no significant relationship was found between education and physical activity, and this finding was consistent with the findings of Rostami Moez et al, (Rostami et al., 2014). In their study, no significant relationship was found between the education of the subjects and the level of physical activity.

The percentage of systolic hypertension (both stages 1 and 2) is higher in women than men: it is 7.3% for women, and 4.5% for men. The percentage of systolic hypertension is higher in men than women: it is 32.5% in men and 26.1% in women, that is, the blood pressure of men is higher than women. This is also consistent with the study of Duc Anh (Ha et al., 2013).

They conducted this study to determine the prevalence, awareness, and control of blood pressure as well as the underlying factors in Vietnam among 2368 adults (over 25 years old). The overall prevalence of hypertension in this

population was 23%. Higher age, male gender, and overweight increase the risk of high blood pressure, in other hand, higher education levels is associated with a lower chance of high blood pressure (Soltanian et al., 2011). Among the limitations of this study, we can name lack of an accurate tool measuring physical activity (e.g. a pedometer), since the accurate measures would help improve the accuracy of the results.

Conclusion:

In summary, the results of the ENCORE study indicate that while the DASH diet alone can reduce BP in overweight, sedentary adults with HBP, there was little evidence that the DASH diet improved insulin sensitivity or lipids without the addition of exercise and weight reduction. It would appear that caloric consumption rather than nutrient composition is most salient for improved metabolic function.

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