

Investigation of the epidemiology of hypertension and BMI in the adult population in the province of Hormozgan, during 2011

Sakineh Dadipoor¹, Sakineh Fallahi², Ali Safari Moradabadi³, Amin Ghanbarnejad⁴, Hossein Montazerghaem^{5*}

1. Master Student Health Education, Research Center for Reproductive Persian Gulf, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.
2. M.Sc in Nursing, Research Center for Reproductive Health & Infertility, Department of Research and Technology, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.
3. Hormozgan University of Medical Sciences, Bandar-e-Abbas, Iran Master Student Health Education, Student Research Committee, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.
4. MS in Biostatistics, Health Promotion Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.
5. Assistant professor of Cardiovascular surgery, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

*Corresponding Author: Hossein Montazerghaem, Assistant professor of Cardiovascular surgery, Hormozgan University of Medical Sciences, Bandar Abbas, Iran. Email: hghaem@yahoo.com

Abstract: Introduction: hypertension is one of the most important risk factors for cardiovascular disease. This disease, if left untreated Created complications in vital organs such as the kidneys, brain, eyes, heart and is a contextly risk factor for coronary artery disease .and Cause of disability, death and impose a huge cost to society. This study aimed to investigate the epidemiology of hypertension and BMI in the adult population in the province of hormozgan. **Materials and Methods:** This study was a descriptive cross-sectional study. 1531 the number of adults in a random sample from different parts of the province were studied. Data collection of pre-set questions, a mercury manometer and the digital scale, Body Mass Index (BMI) was calculated by dividing weight in kilograms by height in meters squared. Hypertension According to the latest JNC-VII guidelines patients was applied to systolic blood pressure ≥ 140 or diastolic blood pressure ≥ 90 mm Hg. Chi-square test was used for statistical analysis. And also to Data describe were used the frequency and percentage. **Results:** The findings showed that the prevalence of hypertension increases with age and BMI. In this study, 58.1% of the subjects had a BMI ≥ 25 and BMI was significant difference between men and women. BMI ≥ 25 were in women (34.94) and male (23.18%). **Conclusion:** This study showed that affected several factors such as BMI, age, sex, diabetes and hyperlipidemia in suffering hypertension.

[Sakineh Dadipoor, Sakineh Fallahi, Ali Safari Moradabadi, Amin Ghanbarnejad, Hossein Montazerghaem, **Investigation of the epidemiology of hypertension and BMI in the adult population in the province of Hormozgan, during 2011.** *Life Sci J* 2013; 10(10s):161 -166] (ISSN: 1097-8135). <http://www.lifesciencesite.com>. 25

Keyword: Hormozgan, BMI, Hypertension, adult population

Introduction:

Hypertension is one of the most important and the most prevalent risk factor of cardiovascular disease. Rapid socio-economic changes in recent decades have led to the rapid prevalence of risk factors of cardiovascular disease such as hypertension. So that studies done on the prevalence of hypertension in people over 30 years in Tehran have reported this rate as 22.9%(1). This condition, if left untreated, will cause various ailments in vital organs such as the kidneys, brain, eyes, heart and creates a risk factor for coronary artery diseases which will be the underlying cause of disability, death and imposing huge cost to society. However, the disease can be controlled and by controlling and reducing hypertension the ailments caused by this disease will significantly reduce as in

the past 25 years in western countries, with the diagnosis and treatment 49% of deaths caused from heart disease and 58% of deaths caused by cerebrovascular diseases has decreased(2). The World Health Organization estimates that in the world one billion people have hypertension. And about 7.1 million people die annually because of the disease (3). In the United States, about one-fifth of the total population have high blood pressure and treating them costs 20 billion dollars annually(4). The America Heart Association has reported that 50 million Americans who are over 6 years old have hypertension(5). These statistics in Egypt, China and Sweden, were respectively 11%, 30%, and 12%(6). Studies in this area in Iran is scattered in Gonabad the prevalence rate of hypertension was over 20.88%, and

14% in Kermanshah, in Tabriz 20.82%, and this rate in Tehran has been reported as 22%(7). In order to prevent life and financial loss caused by the disease, screening is an essential need that is why investigating the prevalence of hypertension is one of the most important national research priorities proposed by the WHO for developing countries. At present, countries such as Egypt, Saudi Arabia, Jordan and other countries in the Eastern Mediterranean region, has investigated the prevalence of hypertension in the form of national design reviews, and has determined it(8). Because of the irrecoverable effects and costly expenses of hypertension and because most people are unaware of their disease, this study aimed to determine the prevalence of hypertension and its associated factors, including age, sex, history of having high blood pressure, familial drive, pharmaceutical records, smoking, and Body Mass Index (BMI).

Materials and Methods

This study is a cross-sectional study aimed to assess the prevalence of hypertension and its associated factors in adult population which was conducted in Hormozgan in 1391. The sample size $Z = 1.96$ And $d = 0.02$ and $p = 20\%$ was determined as 1531. The subjects were divided into 4 groups according to their age who have been listed in Table 2. In this study, the number of health centers and households were determined. Then the city of Hormozgan on the basis of covered areas was divided into six regions. Several families from different areas were randomly enrolled. Inclusion criteria were an adult population and Exclusion criteria includes age below 30 years, pregnant women, women who have had menstrual periods, and lack of family cooperating. Data were collected from two nurses (male and female) with a history of over 18 years working in clinical application. These people were trained about how to measure blood pressure accurately in accordance with World Health Organization Standards and they were justified how important is accurate measurement of blood pressure. After taking the training and blood pressure measurements courses in the presence of experts they were selected as design partners. Thus, the procedure was so that experts went to people's home with a referral from the Department of Medical Sciences of Hormozgan University, and present essential comments on the importance of screening of hypertension and its benefits to those households and after getting their admittance they start their mission. If a family is not willing to cooperate were excluded from the study. And it was replaced by another

randomly selected household from the same area. Information consists of two parts. The first part was of a short questionnaire including information about the age, sex, disease history, family history of hypertension, history of Hyperlipidaemia, diabetes, history of medicine and BMI. At first, the questionnaire was completed through interviewing with people. The second part of the task was clinical in which measurement of blood pressure, height and weight were included. People's blood pressure was measured by a manometer, which its validity and reliability was already proven. The procedure of blood pressure measurement was in this way that patients after at least five minutes rest and relaxation were sitting then by fastening a sound armband to the left arm the sound of the first and fifth diameter cortokofph was measured. And then for 5 to 6 seconds the left arm is kept high and blood pressure is measured again after one minute(9). According to the latest guidelines of JNC-VII Hypertension is defined as a systolic blood pressure ≥ 140 or diastolic blood pressure ≥ 90 mmHg or using antihypertensive during the last month(10). In this study, those with systolic blood pressure of ≥ 140 mm Hg and diastolic blood pressure of ≥ 90 mm were considered as patients with hypertension. And also those who used antihypertensive drugs as doctor's suggestion were considered among patients with hypertension. At the end the patients were weighed by using a portable digital scale 100g precision with minimum wear and their height was measured by using a tape meter in a standing position and without shoes. Pressure gauges and scales were checked regularly in terms of the accuracy during the survey. Body mass index (BMI) was calculated by dividing weight in kilograms by the square of height (in meters). BMI was considered as underweight (less than 18.5), normal (18.5 to 24.9), overweight (25 to 29.9), fat (30 to 39.9), and very obese (greater than or equal to 40)(11). Chi-square test was used for statistical analysis and in order to describe data frequency and percentage were used as well.

Results:

Of total of 1531 patients who enrolled in this study 892 people were women (58.3%) and 639 people were men (41.7%). In this study, 15% of subjects had hypertension which 9% of the subjects who had a history of hypertension used anti hypertension drugs. 44.7% of people had a family history of hypertension, 8% had diabetes, 14.2% and 2.3% had a history of Hyperlipidaemia and a history of myocardial infarction, and 19.3% had a history of smoking (Table 1).

Table 1: Relative frequency of factors associated with blood pressure

Factors associated with hypertension		Man		Woman		Total	
		Number	Percent	Number	Percent	Number	Percent
Family history	yes	267	41.8	418	46.9	685	44.7
	No	372	58.2	474	53.1	846	55.2
Diabetes	yes	24	3.8	99	11.1	123	8
	No	615	96.2	793	88.9	1408	92
Fat	yes	79	12.4	138	15.5	217	14.2
	No	560	87.6	754	84.5	1314	85.8
Smoking	yes	130	20.3	165	18.5	295	19.3
	No	509	79.7	727	81.5	1236	80.7

The results of this study showed that the prevalence of diastolic and systolic hypertension in Hormozgan were respectively 19% and 16.3%, as well as systolic and diastolic blood pressure in the age group over 60, were respectively, 48.5% and 72.2%. While this rate in the age group 30 to 40 years was 6.6% and 7.3% respectively, this showed a significant difference. This suggests that by increasing age, systolic and diastolic blood pressure increases too, and also the most densely upward trend was respectively in the age group 30-40 and 40-50 years (Table 2).

Table 2: Frequency distribution of blood pressure in different age groups

Age group	Total Number	Systolic blood pressure (mm / GH)				Total Number	Diastolic pressure (mm / GH)			
		Normal (140>)		Hypertension (≥ 140)			Normal (90>)		Hypertension (≥ 90)	
		Number	Percent	Number	Percent		Number	Percent	Number	Percent
40-30	802	749	93.4	53	6.6	802	743	92.6	59	7.3
50-40	489	402	82.2	87	17.8	489	376	76.9	113	23.1
60-50	206	112	54.4	94	45.6	206	111	53.9	95	46.1
60 and above	34	17	51.5	17	48.5	34	9	27.3	25	72.7
Sum	1531	1280	83.6	Of 251	16.3	1531	1239	80.1	292	19.9

The results showed that difference between systolic and diastolic blood pressure in men and women was statistically significant (Table 3).

Table 3: Frequency distribution according to sex, blood pressure

Sex	Total Number	Systolic pressure				Total Number	Diastolic pressure			
		Normal		Hypertension			Normal		Hypertension	
		Number	Percent	Number	Percent		Number	Percent	Number	Percent
Man	639	554	86.7	85	13.3	639	477	74.6	162	25.4

Woman	892	727	81.5	165	18.5	892	763	85.5	129	14.5
Sum	1531	1281	83.6	250	16.3	1531	1240	80.9	291	19.01

Table 4 shows the relationship between BMI and hypertension: correlation between systolic blood pressure and body mass index were statistically significant ($p = .002$), in other words systolic blood pressure increased with increasing BMI. And there were also a significant correlation between BMI and diastolic blood pressure ($p = 0.025$).

Table 4: Relationship between body mass index and hypertension

Hypertension BMI		Systolic				Diastolic			
		Natural	Hypertension	Sum	P	Natural	Hypertension	Sum	P
Natural and thin (BMI <25)	Number	553	(88)	641	0.002	532	109	641	0.025
	Percent	36.1	5.7	41.8		34.7	7.11	41.86	
Overweight and obesity (BMI ≥ 25)	Number	728	Of 162	Of 890		To 708	182	Of 890	
	Percent	47.5	10.58	58.1		46.2	11.9	58.13	
Total	Number	1281	250	1531		1240	291	1531	
	Percent	83.6	16.4	100		80.99	19.01	100	

The results of this study showed that the body mass index ($p = 0.00$), MI ($P = 0.003$), Family history ($p = 0.00$), Sex ($p = 0.00$), and Hyperlipidaemia ($p = 0.014$) all had a significant correlation with systolic blood pressure. However, no significant correlation was found between the variables related to smoking and diabetes and systolic blood pressure. And a significant correlation was found between body mass index ($p = 0.00$), MI ($p = 0.00$), Family history ($p = 0.002$), Sex ($p = 0.00$), Smoking ($p = 0.00$), Hyperlipidaemia ($p = 0.027$) and diastolic blood pressure.

Discussion and Conclusion: The results of this study showed that of 1531 people about in Hormozgan 540 were hypertensives. According to the latest guidelines of NC-VII prevalence of hypertension in Hormozgan was estimated as 35.3%. These outbreaks are near to figures from the World Health Organization in Iran during 1390 (about 40%). Prevalence of hypertension in the study was similar to the results of Azqnd Vlypyd in Tehran (36%) (12) and other countries such as Turkey (30.3%), (13), Greece (31.1%) (14) and Debrecen, Hungary (37.2%) (15) and the hypertension rate was less than studies done by Zarei et al in Jahrom with the prevalence rate of (58.4%) (2), and Shiraz (48.25%) (16), and the prevalence rate in this study was higher than the

results of studies which were done in Tabriz (20.82), Uromiyeh (23.4), Rafsanjan (23.2), Kermanshah (14.3), (17), Semnan (24.35), (18), Qazvin (17.2) (2), and study of Ray et al in Kermanshah (15.7) (19) and Aziz et al study in Tehran in adult population (21.35) (12). The difference in the prevalence of hypertension in different parts of Iran could be related to various factors such as age of Iranian participants in the study, their definition of blood pressure, sample size, geographic location, lifestyle and cultural differences. For example, the prevalence of hypertension in people over 18 years old in Zabol was (12.24%) (20). While in this study the prevalence of hypertension was estimated as (35.3%). This difference could be because of the age of people because in the present study the lowest age range was 30 years old while the lowest range was 18 years old in study which was done in Zabol. In the current study it was observed that hypertension in men (38%) was more than that in women (33%). The results of studies was consistent with findings from studies in northern India, Malaysia, Greece, America, older individuals of Yasuj, but the results of this study were inconsistent with studies in Kuwait, Tehran Population Database (Area 17), Zabol, Urumieh and study of Lipid and Glucose in Tehran in which the prevalence of hypertension was higher in women than

men. In a study which was done in Tabriz research and a shared study in India and Bangladesh a significant difference in sexes was not observed(17). Our findings show that the prevalence of hypertension significantly increases with age, which can be due to an increase in vascular resistance, formation of atherosclerosis plaque formation, thickening of the vessel wall, and hormonal disorders which the results of this study is consistent with studies in Iran and foreign countries(17). Furthermore the prevalence of hypertension in people over 60 years old in this study was estimated as (60.6%) which was consistent with the results of studies which were done in Shiraz study (66.4%), Malaysia (67.6%), America (67%), and Bangladesh (65%)(17). In the current study a direct relationship was observed between increasing body mass and the prevalence of hypertension. There was also a direct connection between increasing age and increasing BMI this can be due to decrease in body's metabolic rate (BMR decreases 2% per year) the results of the current study are consistent with the results of other studies(20-29). In the present study 58.1% of the subjects had BMI \geq 25 and the difference between women (34.94%) and men (23.18%) was significant difference. In a study conducted in north of Iran 53.65% people were overweight or obese and the prevalence of obesity was higher in women than in men. As well in Kuwait, 58% of the population (63.4% of women and 53% men) were overweight or obese and this was corresponded with the current study. In Egypt, 47% of patients with hypertension were obese(17). Epidemiologic study of obesity and hypertension in Uzbekistan showed that obese men and women are afflicted with hypertension 3 times more than men and women with normal body mass index(26). The results of the above mentioned survey, was as a result of high prevalence of hypertension is Hormozgan in which various reasons, including ethnic diversity, lack of exercise (due to water and air condition) can be involved. In this study, factors such as hyperlipidaemia, diabetes, family history of hypertension and smoking can be effective. It is hoped that the results of this study will help health officials and allow them to identify those at risk, effective factors in being hypertensive, a change of lifestyle and to inform the community about how to prevent high blood pressure may be in this way costly and irreversible complications of hypertension can be prevented.

Acknowledgments: The authors oblige themselves to thank honorable people of Hormozgan who Collaborated on these projects. And sincere thanks go to University of Medical Sciences and Research Council in Bandar Abbas, Hormozgan for financial.

Corresponding Author:

Hossein Montazerghaem, Assisstant professor of Cardiovascular surgery, Hormozgan University of Medical Sciences, Bandar Abbas, Iran. Email: hghaem@yahoo.com

References

- 1- ESMAEILZADEH A, L. A. Anthropometric assessment to predict hypertension among women in Tehran, Iran. TEHRAN UNIVERSITY MEDICAL JOURNAL (TUMJ). 2008;66(6):413-20.
- 2- BEYGIZADEH S, ZAREEI S, POURAHMADI M. THE PREVALENCE OF HYPERTENSION AND FACTORS AFFECTING IT IN JAHROM CITY. JAHROM MEDICAL JOURNAL. 2009.
- 3- Report WH. Reducing risks, promoting healthy life. Geneva, Switzerland: World Health Organization; 2002. World Wide Web URL: <http://www.who.int/whr/2002/en>. 2002.
- 4- Brunner H. Clinical hypertension and hypotension Decker Newyork. 1995:3-21.
- 5- Association AH. Heart ans stroke statistical update. 2001:(ICD401-4.
- 6- Roshandel F, M. A. Effect of weight loss in obese women on primary prevention of hypertension in Tehran. sexual and physical health. 1996:102PERSIAN.
- 7- Mansoorian M, Qorbani M, Shafieyan N, Asayesh H, Shafieyan Z, Maghsodloo D. Association between life style and hypertension in rural population of Gorgan. Journal of Health Promotion Management. 2012;1(2):23-8.
- 8- Fakhrzadeh H pIR. Hypertension in the population over 19 years of Bushehr. tebe jonob. 1998;1(3):31-223.
- 9- Klein R, Klein BE, Lee KE, Cruickshanks KJ, Moss SE. The incidence of hypertension in insulin-dependent diabetes. Archives of internal medicine. 1996;156(6):622.
- 10- Chobanian AV, Bakris G, Black H, Cushman W, Green L, Izzo Jr J, et al. National heart, lung, and blood institute joint national committee on prevention, detection, evaluation, and treatment of high blood pressure; national high blood pressure education program coordinating committee. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC. 2003;7:2560-72.
- 11- Joshaghani H, F. N. People awareness of hypertension in Golestan province, North of Iran

- (2006). Journal of Gorgan University of Medical Sciences. 2011;13(2):68-78.
- 12- Azizi F, Ghanbarian A, Madjid M, Rahmani M. Distribution of blood pressure and prevalence of hypertension in Tehran adult population: Tehran Lipid and Glucose Study (TLGS), 1999-2000. Journal of human hypertension. 2002;16(5):305-12.
 - 13- Tugay Aytakin N, Pala K, Irgil E, Akis N, Aytakin H. Distribution of blood pressures in Gemlik District, north-west Turkey. Health & social care in the community. 2002;10(5):3,401-94.
 - 14- Efstratopoulos AD, Voyaki SM, Baltas AA, Vratsistas FA, Kirlas D-EP, Kontoyannis JT, et al. Prevalence, Awareness, Treatment and Control of Hypertension in Hellas, Greece&ast. American journal of Hypertension. 2006;19(1):53-60.
 - 15- Jenei Z, Pall D, Katona E, Kakuk G, Polgar P. The epidemiology of hypertension and its associated risk factors in the city of Debrecen, Hungary. Public Health. 2002;116(3):138-44.
 - 16- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, et al. Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. Hypertension. 2003;42(6):1206-52.
 - 17- Azizi A, Abasi M, Abdoli G. The prevalence of Hypertension and its Association with Age, Sex and BMI in a Population Being Educated Using Community-Based Medicine in Kermanshah: 2003. Iranian Journal of Endocrinology and Metabolism. 2008;10(4):323-9.
 - 18- Ghorbani R, Askandarian R, Malek M, Rashidy-Pour A. Prevalence of hypertension among the adult population of Semnan province. Iranian Journal of Endocrinology and Metabolism. 2009;10(5):495-503.
 - 19- Ray A, Saeidi N, Rezaei M, B. K. Prevalence of hypertension and cardiovascular risk factors at 19aged and upper in Kermanshah city. Kermanshah University Medical Science. 1999;Final report project(number 76014).
 - 20- Goodarzi M, Badakhsh M, Masinaei Nejad N, Abbas Zadeh M. Hypertension prevalence in over 18-year-old population of Zabol. Razi Journal of Medical Sciences. 2004;11(43):821-7.
 - 21- Mohan V, Deepa M, Farooq S, Datta M, Deepa R. Prevalence, Awareness and Control of Hypertension in Chennai-The Chennai Urban Rural Epidemiology Study (CURES-52). Journal of Association of Physicians of India. 2007;55:326-32.
 - 22- Rampal L, Rampal S, Azhar M, Rahman AR. Prevalence, awareness, treatment and control of hypertension in Malaysia: A national study of 16,440 subjects. Public Health. 2008;122(1):11-8.
 - 23- Ostchega Y, Dillon CF, Hughes JP, Carroll M, Yoon S. Trends in hypertension prevalence, awareness, treatment, and control in older US adults: data from the National Health and Nutrition Examination Survey 1988 to 2004. Journal of the American Geriatrics Society. 2007;55(7):1056-65.
 - 24- Fakhzadeh H, Nouri M, Pourebrahim R, Ghotbi S, Hashmat R, Bastanhigh M. Prevalence of hypertension and risk factors at 25-64aged in population research center, Tehran Medical University. Iranian Journal of Diabetes & Lipid Disorder. 2003;1:43-9.
 - 25- Rahmati F, MOGHADASS TY, SHIDFAR M, Habibi F, JAFARI M. Prevalence of obesity and hypertension among Tehran University students. PAYESH. 2004.
 - 26- Mishra V, Arnold F, Semenov G, Hong R, Mukuria A. Epidemiology of obesity and hypertension and related risk factors in Uzbekistan. European journal of clinical nutrition. 2006;60(12):1355-66.
 - 27- Aiyer AN, Kip KE, Mulukutla SR, Marroquin OC, Hipps Jr L, Reis SE. Predictors of significant short-term increases in blood pressure in a community-based population. The American journal of medicine. 2007;120(11):960-7.
 - 28- Hajian-Tilaki K, Heidari B. 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. Obesity reviews. 2007;8(1):3-10.
 - 29- Oparil S. Women and hypertension: what did we learn from the Women's Health Initiative? Cardiology in review. 2006;14(6):267-75.