# Prevalence of hypertension in women above 30 years of age in Minoudar, Qazvin, Iran

Ameneh Barikani[(1)], Fatemeh Saeedi[(2)]

## Abstract

**BACKGROUND:** Hypertension (HTN) is one of the most important causes of early mortality and a risk factor of many diseases such as cerebrovascular and coronary artery diseases and renal failure. We aimed to determine the prevalence of HTN in women above 30 years of age in Qazvin, Iran.

**METHODS:** In a cross- sectional study in Minoudar (Qazvin, Iran), 328 women who aged above 30 years old were selected using simple random sampling. Their sitting blood pressure was measured twice and the mean values were recorded. Their height and weight were also measured and their body mass index (BMI) was calculated. Data was collected in a questionnaire including age, education, smoking, alcohol, oral contraceptive pills (OCP) and salt consumption, and history of HTN and its treatment. The collected data was analyzed using descriptive statistics and chi-square test in $SPSS_{16}$. P values less than 0.05 were considered significant.

**RESULTS:** The mean age of participants was 47.3 ± 1.1 years. Total frequency of HTN was 32%. In addition, 59.2% of hypertensive individuals were aware of their disease. While 48.1% of them were receiving treatment, only 21.3% had controlled blood pressure. Salt intake was determined as none, moderate, and high in 9.1%, 63.7%, and 27.1% of the participants, respectively. Most subjects (71.6%) did not exercise, 12.8% exercised less than 2 hours a week and 15.5% exercised more than 2 hours a week. Overall, 8.8% of the participants had used OCP. None of the subjects had used alcohol. Overweight and obesity were detected in 38.7% and 40.8% of the studied women, respectively. There were significant relations between age and systolic and diastolic blood pressure ($P < 0.01$). Moreover, salt intake was significantly related with high systolic and diastolic blood pressure ($P = 0.02$).

**CONCLUSION:** A significant percentage of hypertensive participants did not know about their disease and did not have controlled blood pressure. Most women did not perform adequate exercise.

**Keywords:** Hypertension, Systolic Blood Pressure, Diastolic Blood Pressure, Body Mass Index

***ARYA Atherosclerosis Journal 2012, 8(Special Issue in National Hypertension Treatment): S158-S162***

***Date of submission:*** 1 Jan 2012, ***Date of acceptance:*** 22 Mar 2012

## Introduction

High blood pressure is the leading risk factor for stroke, coronary artery disease, heart and renal failure, and other chronic diseases.[1-4] It accounts for about 13% of all deaths and is the strongest risk factor for lost years of healthy life.[2] While one billion people throughout the world have hypertension (HTN), two thirds of this population live in developing countries.[5] HTN has a strong relation with mortality from diseases such as cardiovascular and cerebrovascular diseases and heart and renal failure.[6] Different studies have shown that the risks associated with HTN can be partially reversed if an optimal control is achieved.[7,8]

HTN is an important public health problem of global dimensions in both developed and developing counties.[9] It is a growing problem and one of the most important causes of premature death worldwide. In fact, it annually kills nearly 8 million people from around the world.[10] In 2025, an estimated number of 1.56 billion adults will be living with HTN.[10]

HTN is largely preventable by adopting lifestyle modification at early stages. Its treatment will be associated with a reduction in cardiovascular complications. In the Eastern Mediterranean region, the average prevalence of HTN is 29% and it affects approximately 125 million individuals.[11]

The rapid social and economic transition in Iran has been accompanied by cultural changes, reduction of communicable diseases, increased life expectancy,

1- Assistant Professor, Department of Community Medicine, School of Medicine, Qazvin University of Medical Sciences, Qazvin, Iran
2- General Practitioner, Qazvin University of Medical Sciences, Qazvin, Iran
Correspondence To: Ameneh Barikani, Email: barikani.a@gmail.com



www.mui.ac.ir

changes in nutritional habits and physical activity, and increases in non-communicable diseases such as HTN, diabetes, and cardiovascular diseases and their risk factors.[12] The aim of this study was to estimate the prevalence of HTN among women who had referred to the primary health care setting in Minoudar of Qazvin, Iran.

## Materials and Methods

We conducted a cross-sectional survey on 328 Iranian women that had referred to the primary health care center of Minoudar (Qazvin, Iran) in 2008. Simple random sampling was used to select subjects from women who had family care files in the center. The participants were invited to the center and informed consents were obtained. Afterward, their blood pressure was measured at sitting position after at least 15 minutes of rest. Women were asked not to smoke or use caffeine 30 and 60 minutes before the tests, respectively. Measurements were performed in the right arm while the arm was horizontal and supported at the level of the heart. A standard mercury sphygmomanometer and a cuff of suitable size were used by a trained staff member to measure blood pressure. Korotkoff phases 1 and 5 were used to determine systolic blood pressure (SBP) and diastolic blood pressure (DBP), respectively. Two measurements with a 30-minute interval were performed and the mean values were calculated.

Height and weight were measured using standard devices with participants in light clothes and without shoes. To measure height, a measuring tape was fixed to the wall and the participants stood with their heels, buttocks, shoulders, and occiput touching the vertical tape.

In addition, age, education level, smoking habit, alcohol use, salt intake, oral contraceptive pills (OCP) consumption, physical activity, history of HTN, and treatment history of the participants were asked in interviews.

Based on the guidelines of the World Health Organization (WHO), normal blood pressure is defined as not being on antihypertensive medication and having SBP < 140 mmHg and DBP < 90 mmHg. Mild HTN is defined as not being on antihypertensive medication and having SBP of 140-180 mmHg and DBP of 90-100 mmHg. HTN is defined as not being on antihypertensive medication and having SBP > 180 mmHg and DBP > 110 mmHg.[13]

Body mass index (BMI) of the subjects was calculated by dividing weight (kg) to height squared ($m^2$). According to the WHO and the National Heart, Lung, and Blood Institute (NHLBI) underweight, normal weight, overweight, and obesity were defined as BMI < 18.5, 18.5-24.9, 25-29.9, ≥ 30 $kg/m^2$, respectively.[12,14,15]

Data was analyzed using SPSS for Windows 16.0 (SPSS Inc., Chicago, IL, USA). Chi-square test was used to evaluate associations between HTN and different independent variables. P values less than 0.05 were considered significant.

## Results

Data obtained from 328 subjects was analyzed. Their mean age was 47.3 ± 1.1 years. Table 1 describes the demographic characteristics of the participants. Overall, 25% were illiterate and 16% were smokers. Most participants were overweight and obese.

**Table 1.** Demographic and clinical characteristics of participants (n = 328)

| Variable | N | % |
|---|---|---|
| Education | | |
| Illiterate | 82 | 25 |
| Elementary school | 193 | 58.8 |
| Secondary school | 51 | 15.5 |
| Higher education | 2 | 0.6 |
| Smoking habit | | |
| Yes | 2 | 0.6 |
| No | 326 | 99.4 |
| Salt intake | | |
| No salt | 30 | 9.1 |
| Adding salt during cooking | 209 | 63.7 |
| Adding table salt | 89 | 27.1 |
| Exercise | | |
| Never | 325 | 71.6 |
| Less than 2 hours a week | 42 | 12.8 |
| More than 2 hours a week | 51 | 15.5 |
| Oral contraceptive pills | | |
| Yes | 29 | 8.8 |
| No | 299 | 91.2 |
| Body mass index ($kg/m^2$) | | |
| < 18.5(Thin) | 8 | 2.4 |
| 18.5-24.9 (Normal) | 59 | 18.1 |
| 25-29.9 (Overweight) | 126 | 38.7 |
| ≥ 30 (Obese) | 133 | 40.8 |

Among 30-40 year-old subjects, 3.1% and 3.0% had high DBP and SBP, respectively. Tables 2 and 3 show the distribution of DBP and SBP stratified based on age, BMI, OCP consumption, exercise, salt intake, and smoking habit.

While total frequency of HTN was 32.0%, 16.1%, 17.9%, and 8% of the participants had high SBP, high DBP, and both problems, respectively. In addition, 61.5% of hypertensive individuals were aware of their



www.mui.ac.ir

disease. Although 48.1% were receiving treatment, only 21.3% had controlled blood pressure. Moreover, 71.6% of the subjects did not exercise at all and 8.8% had used OCP for 9.8 ± 6.1 years. Maximum and minimum BMI were 45 and 16, respectively. None of thin persons had HTN. The prevalence of HTN among inactive women was 9.7%. None of the participants had used alcohol.

## Discussion

We found high prevalence of HTN among women aging above 30 in Minoudar (Qazvin, Iran). In a nationwide study, the prevalence of HTN was 19.8% in men and 26.9% in women.[12] The total prevalence of HTN was 32.0% in our study that was higher than previous rates in this region.[16] The prevalence of HTN has been reported as 24% in China, 27% in Singapore, and 22% in Thailand.[17,18] Higher prevalence of HTN has been reported in other countries such as Germany (55%), Finland (49%), and Spain (47%).[19]

Economic development and changes in lifestyle and life expectancy may help to explain the rapid increase in the prevalence of HTN in Iran.[12] BMI is one of the most important predictor of HTN. Many previous studies have indicated obesity as an important risk factor for HTN.[12,20-25] In our study however, no such significant relation was found. The reason might have been differences in age between BMI groups. Most participants in our study were below 50 years of age.

We also found that higher prevalence of HTN in older subjects. In other words, similar to the findings of previous studies in Iran,[12,21,23,26] the prevalence of HTN increased with increasing age. Age is thus one of the most important predictors of HTN.

**Table 2.** Diastolic blood pressure of participants (n = 328) stratified based on age, body mass index (BMI), oral contraceptive pills (OCP) consumption, exercise, salt intake, and smoking habit

| Variable | Diastolic blood pressure (mmHg) | | | | |
|---|---|---|---|---|---|
| | < 90 | 90-100 | 100-110 | > 110 | P |
| Age (years) | | | | | |
| 30-40 | 37.8 | 1.2 | - | - | |
| 41-50 | 32.3 | 0.9 | 0.3 | - | |
| 51-60 | 14.9 | 2.4 | 0.3 | - | < 0.01 |
| 61-70 | 4.6 | 0.9 | - | - | |
| > 70 | 2.4 | 1.8 | - | - | |
| BMI (kg/m$^2$) | | | | | |
| < 18.5 | 2.5 | - | - | - | |
| 18.5-24.9 | 17.5 | 0.6 | - | - | 0.20 |
| 25.0-29.9 | 35.9 | 2.5 | 0.3 | - | |
| > 30.0 | 36.5 | 4.0 | 0.3 | - | |
| OCP consumption | | | | | |
| Yes | 8.8 | - | - | - | 0.30 |
| No | 83.2 | 7.3 | 0.6 | - | |
| Exercise | | | | | |
| Never | 64.6 | 6.4 | 0.6 | - | |
| Less than 2 hours a week | 12.5 | 0.3 | - | - | 0.01 |
| More than 2 hours a week | 14.5 | 0.6 | - | - | |
| Salt intake | | | | | |
| No salt | 8.2 | 0.6 | 0.3 | - | |
| Adding salt during cooking | 60.4 | 3.4 | - | - | 0.03 |
| Adding table salt | 23.5 | 3.4 | 0.3 | - | |
| Smoking habit | | | | | |
| Yes | 0.6 | - | - | - | 0.30 |
| No | 91.5 | 7.3 | 0.6 | - | |

Values are expressed as percentages.



www.mui.ac.ir

**Table 3.** Systolic blood pressure of participants (n = 328) stratified based on age, body mass index (BMI), oral contraceptive pills (OCP) consumption, exercise, salt intake, and smoking habit

| Variable | Systolic blood pressure (mmHg) | | | | |
|---|---|---|---|---|---|
| | < 140 | 140-160 | 160-180 | > 180 | P |
| Age (years) | | | | | |
| 30-40 | 36.0 | 3.0 | - | - | |
| 41-50 | 29.0 | 4.3 | 0.3 | - | |
| 51-60 | 14.0 | 3.4 | 0.3 | - | < 0.01 |
| 61-70 | 3.0 | 2.1 | 0.3 | - | |
| > 70 | 1.8 | 2.4 | - | - | |
| BMI (kg/m$^2$) | | | | | |
| < 18.5 | 2.1 | 0.3 | - | - | |
| 18.5-24.9 | 15.6 | 2.5 | - | - | 0.20 |
| 25.0-29.9 | 34.4 | 3.7 | 0.6 | - | |
| > 30.0 | 31.9 | 8.6 | 0.3 | - | |
| OCP consumption | | | | | |
| Yes | 8.5 | 0.3 | - | - | 0.10 |
| No | 75.3 | 14.9 | 0.9 | - | |
| Exercise | | | | | |
| Never | 58.8 | 11.9 | 0.9 | - | |
| Less than 2 hours a week | 11.0 | 1.8 | - | - | 0.60 |
| More than 2 hours a week | 14.0 | 1.5 | - | - | |
| Salt intake | | | | | |
| No salt | 7.0 | 2.1 | - | - | |
| Adding salt during cooking | 57.0 | 6.7 | - | - | < 0.01 |
| Adding table salt | 19.8 | 6.4 | 0.9 | - | |
| Smoking habit | | | | | |
| Yes | 0.6 | - | - | - | 0.50 |
| No | 83.2 | 15.2 | 0.9 | - | |

Values are expressed as percentages.

In addition, as reported by other Iranian studies,[27] a significant relation was found between exercise and DBP. Another well-known risk factor for HTN is excessive salt intake.[28] In this study, we found a statistically significant relation between HTN and salt intake.

Finally, only 59.2% of our hypertensive participants were aware of their disease. A previous study in Iran reported a similar rate.[21] Since HTN is an asymptomatic disease, especially in early stages, people (particularly those above 30 years of age) must be educated and screened for it.

## Conflict of Interests

Authors have no conflict of interests.

## References


1. MacMahon S, Peto R, Cutler J, Collins R, Sorlie P, Neaton J, et al. Blood pressure, stroke, and coronary heart disease. Part 1, Prolonged differences in blood pressure: prospective observational studies corrected for the regression dilution bias. Lancet 1990; 335(8692): 765-74.
2. Duron E, Hanon O. Hypertension, cognitive decline and dementia. Arch Cardiovasc Dis 2008; 101(3): 181-9.
3. Jafar TH, Stark PC, Schmid CH, Landa M, Maschio G, De Jong PE, et al. Progression of chronic kidney disease: the role of blood pressure control, proteinuria, and angiotensin-converting enzyme inhibition: a patient-level meta-analysis. Ann Intern Med 2003; 139(4): 244-52.
4. Tozawa M, Iseki K, Iseki C, Kinjo K, Ikemiya Y, Takishita S. Blood pressure predicts risk of developing end-stage renal disease in men and women. Hypertension 2003; 41(6): 1341-5.
5. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. JAMA 2003; 289(19): 2560-72.
6. Al-Rukban MO, Al-Sughair AM, Al-Bader BO, Al-Tolaihi BA. Management of hypertensive patients in




www.mui.ac.ir

primary health care setting, auditing the practice. Saudi Med J 2007; 28(1): 85-90.
7. Konzem SL, Devore VS, Bauer DW. Controlling hypertension in patients with diabetes. Am Fam Physician 2002; 66(7): 1209-14.
8. Padwal R, Straus SE, McAlister FA. Evidence based management of hypertension. Cardiovascular risk factors and their effects on the decision to treat hypertension: evidence based review. BMJ 2001; 322(7292): 977-80.
9. WHO. World Health Report. Hypertension [Online]. 1997; Available from: URL: http://www.who.int/cardiovascular_diseases/guidelines/hypertension_guidelines.pdf/
10. WHO. Hypertension Fact Sheet [Online]. 2011; Available from: URL: http://www.searo.who.int/linkfiles/non_communicable_diseases_hypertension-fs.pdf/
11. WHO. EMRO -Non-communicable disease [Online]. 2011; Available from: URL: http://www.emro.who.int/entity/noncommunicable-diseases/
12. Janghorbani M, Amini M, Gouya MM, Delavari A, Alikhani S, Mahdavi A. Nationwide survey of prevalence and risk factors of prehypertension and hypertension in Iranian adults. J Hypertens 2008; 26(3): 419-26.
13. 1999 World Health Organization-International Society of Hypertension Guidelines for the Management of Hypertension. Guidelines Subcommittee. J Hypertens 1999; 17(2): 151-83.
14. Obesity: Preventing and Managing the Global Epidemic. Geneva, Switzerland: World Health Organization; 2000.
15. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults--The Evidence Report. National Institutes of Health. Obes Res 1998; 6 (Suppl 2): 51S-209S.
16. Mazloomi R, Mazloomi A, Talebi R. Assessment of hypertension in Qazvin adults [Thesis]. Qazvin, Iran: Qazvin University of Medical sciences; 1999. [In Persian].
17. Wolf-Maier K, Cooper RS, Banegas JR, Giampaoli S, Hense HW, Joffres M, et al. Hypertension prevalence and blood pressure levels in 6 European countries, Canada, and the United States. JAMA 2003; 289(18): 2363-9.
18. Wang Z, Wu Y, Zhao L, Li Y, Yang J, Zhou B. Trends in prevalence, awareness, treatment and control of hypertension in the middle-aged population of China, 1992-1998. Hypertens Res 2004; 27(10): 703-9.
19. Kannel WB, Brand N, Skinner JJ, Dawber TR, McNamara PM. The relation of adiposity to blood pressure and development of hypertension. The Framingham study. Ann Intern Med 1967; 67(1): 48-59.
20. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. Circulation 2002; 106(25): 3143-421.
21. Behforuz MR, Sajjadi MA, Sayadi AR. Prevalence of hypertension; awarness, treatment and its control in over 18 year old individuals in Rafsanjan. J Rafsanjan Univ Med Sci 2002; 1(2): 85-91. [In Persian].
22. John U, Meyer C, Hanke M, Volzke H, Schumann A. Smoking status, obesity and hypertension in a general population sample: a cross-sectional study. QJM 2006; 99(6): 407-15.
23. Kaur K, Mogra R. Association of Body Mass Index, Body Fat and Hypertension among Postmenopausal Women. J Hum Ecol 2006; 20(3): 171-5.
24. Duprez D, Van HP, Van den Eynde W, Leeman M. Prevalence of hypertension in the adult population of Belgium: report of a worksite study, Attention Hypertension. J Hum Hypertens 2002; 16(1): 47-52.
25. Shahbazpoor N. Prevalence of overweight and obesity and their relation to hypertention in adult male university students in Kerman. Iran Int j Endocrinol Metab 2003; 2: 55-60. [In Persian].
26. Ascherio A, Hennekens C, Willett WC, Sacks F, Rosner B, Manson J, et al. Prospective study of nutritional factors, blood pressure, and hypertension among US women. Hypertension 1996; 27(5): 1065-72.
27. Moghimi M, Salari M, Abbasi A, Saniei F, Nemati S. The Hypertension Rate and It's Risk Factors in Elders of Yasouj 2005. Quarterly Journal of Yasuj Faculty of Nursing And Midwifery 2006; 1(2): 61-70. [In Persian].
28. Fisher N, Williams G. Hypertensive vascular disease. In: Kasper DL, Fauci AS, Braunwald E, Longo DL, Hauser SL, Jameson JL, Editors. Harrison's Principles of Internal Medicine Set.Philadelphia, PA: McGraw-Hill; 2004. p. 1463-70.

**How to cite this article:** Barikani A, Saeedi F. **Prevalence of hypertension in women above 30 years of age in Minoudar, Qazvin, Iran.** ARYA Atherosclerosis Journal 2012; 8(Special Issue in National Hypertension Treatment): S158-S162.



www.mui.ac.ir