A SURVEY OF CARDIOVASCULAR RISK FACTORS IN BABOLIAN RURAL HYPERTENSIVES

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ABSTRACT

High blood pressure control (HBPC) is a common goal of WHO and the world hypertension league (WHL). The two important strategies in HBPC are identifying cardiovascular (CVD) risk factors and planning to modify controllable factors. This study was accomplished to determine the CVD risk factors in high blood pressure (HBP) patients of the rural population, residing in the Babol region, north of Iran, in the year 2000. This study was a cross-sectional research. 150 hypertensive patients were selected by cluster random sampling method. The data were collected with two questionnaires (demographic characters and behavioral habits questionnaire and Eschpel Burger's anxiety record) and laboratory tests. The data analysis has indicated that the rate of most risk factors such as cholesterol level, body mass index, anxiety score and other factors is highly elevated. The results demonstrated that the rates of CVD risk factors were higher in Iranian hypertensive patients compared to other countries. Probably, because of this, the maximum rate of achievement of high blood pressure control was only 18.4%.

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INTRODUCTION

Arterial hypertension is the most common cardiovascular disease and a major public health problem in both developed and developing countries, affecting about 20% of the adult population worldwide.[1] Taking hypertension as a blood pressure greater than 140/90 mmHg, reports have indicated the prevalence among adults (18 years old and above) to be 20.4% and 25% in Saudi Arabia and 20.7% and 13.8%[3] in Iran for systolic and diastolic hypertension respectively. Another report has indicated the prevalence of hypertension among adults (18 years old and above) to be 28.5% and 19.6% in Taiwanian men and women respectively.[4] In addition, the prevalence of hypertension has been reported to be 22% in Canada[5], 11.26% in China,[6] 30.43% in Egypt,[7] and 20% in Sweden and the USA.[8]

Regarding the treatment and control of hypertension, the above reports indicate that the rate of treatment and control have been 43% and 16% in Canada,[5] 12.5% and 3% in China,[6] and 57% and 27% in the USA.[9]

Brunner and Suddarth[10] quote that "Hypertension is a major cause of heart failure, stroke and kidney failure. It is called the "silent killer", because the person who has it is often symptom free." The goal of prevention and management of hypertension is to reduce mor-

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bidity and mortality by the least intrusive means possible. This may be accomplished by achieving and maintaining systolic blood pressure below 140 mmHg and diastolic blood pressure below 90 mmHg and lower if tolerated, while controlling other modifiable risk factors for cardiovascular diseases. The risk for cardiovascular diseases in patients with hypertension is determined not only by the level of blood pressure but also by the presence or absence of target organ damage or other factors such as smoking, dyslipidemia, and diabetes as determined in risk groups A, B, and C.[9]

Consequently, this research was undertaken to determine the CVD risk factors in high blood pressure patients in a rural population.

MATERIAL AND METHODS

This study is a descriptive-analytic research of cross-sectional type. The community of this research was all of the Babolian rural population suffering from HBP. Babol is situated at the north of Iran with a rural population of 250 thousand, 23 therapeutic & health centers and 164 health homes. The subjects were selected by cluster random sampling method. Initially, of 23 centers, two of them, including 14 health-homes, were chosen, then 150 of the screened patients were selected. According to previous studies, the sample size was estimated (P=0.26, d=0.02, and Z=1.96). The samples had health-files and have been treated at least for one year. They were called to the health center and then were informed about the research goals. In terms of the international protocol of blood pressure measurement guidelines, their blood pressures were measured twice, and the mean of both measurements was considered as a base. The demographic data, behavioral habits and some CVD risk factors such as cigarette smoking, weight, and nutrition were collected by a specific questionnaire. In order to evaluate some laboratory variables such as LDL, HDL, and cholesterol,
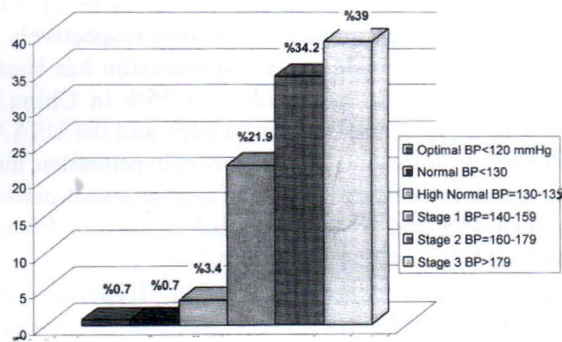
the patients were referred to a valid laboratory. As anxiety is a type of risk factor, its level was measured by Eschpel Burger's anxiety record. Because most of the patients were illiterate, the questionnaire was completed via interview. The validity and reliability of Eschpel Burger's record was verified in 1993 in the Iranian population by Dr. Dadsetan.

The data was analyzed by SPSS software. The demographic and paraclinical variables of the samples were described using descriptive statistics such as mean, and standard deviation (SD). The quantitative variables such as CVD risk factors, anxiety scores, and blood pressure associations by demographic variables were estimated using parametric and non-parametric statistics such as t-test and chi-square.

RESULTS

110 (73.5%) patients were female with a mean age of 58.2; 120 (80%) of them were married; 14 persons (9.5%) were addicted to opium and 14 (9.5%) were accustomed to smoking. 90 persons or 60% of the subjects had light to moderate activities such as housekeeping & gardening and 60 (40%) were engaged in heavy physical activity such as farming & working. 17 patients (10.9%) suffered from diabetes and 3.4% from COPD. The diet of 135 patients (90%) consisted of red meat, high fat milk and yogurt and eggs. 91 of the subjects (61.2%) had a regular diet or high-salt diet. 120 of them (80%) had used anti-hypertensive drugs, including methyldopa (50%), beta blockers (32%), nitrates (6.6%), diuretics (4.2%), ACE inhibitors (3.5%), and calcium channel blockers (3.5%). Contraceptives were used by 48 of the females (32%). The mean period of their use was 8.7 years. The paraclinical variables (LDL, HDL, and cholesterol) are shown in Table I. Based on the Eschpel Burger record, average of state, trait, and total anxiety were 43.28, 46.06, and 89.38 respectively.

Fig. 1. The range of systolic blood pressure in our patients based on the WHO/WHL classification.
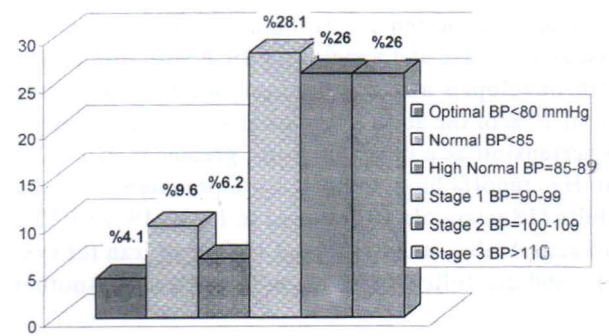
Fig. 2. The range of diastolic blood pressure in our patients based on the WHO/WHL classification.

The mean systolic blood pressure was 171.41 mmHg and diastolic blood pressure was 99.31 mmHg. The WHO / WHL blood pressure classification is shown in Figs. 1 and 2.

According to standard criteria for high blood pressure control, i.e., less than 140/90 mmHg, 18.4% of patients were controlled.

DISCUSSION

Various risk factors were considered including modifiable and non-modifiable factors; age is a non-modifiable factor. 110 patients (73.5%) were aged more than 50 years. There was a positive correlation between systolic (mean=171 mmHg; r=0.016; $p<0.05$) and diastolic blood pressure (mean=99 mm Hg; r=0.2; $p<0.01$) with age (mean= 58.2yr).

Chalmers and colleagues[12] have quoted that "In most populations, the risk of CVD rises steeply with increasing age. This powerful effect of age on disease risk has important consequences for the effects of blood pressure and other risk factors on disease occurrence".[12]

Another important modifiable factor is cigarette smoking. The rate of smokers was low, i.e. 14 persons (9.5%). The main reason for this was the high number of females (73%) and their lack of tendency toward smoking. Furthermore the rural men engaged in heavy physical activity. There was no significant difference in the average systolic and diastolic blood pressure between smokers and nonsmokers in males. Further, there was no significant difference in the average LDL, HDL, and cholesterol levels between smokers and non-smokers in males.

Diabetes is a major CVD risk factor. In this study, 16 (10.9%) of the patients were diabetic. The number of Indian hypertensive patients suffering from diabetes has been reported to be 40%.[6] Although in this study it is not high. Because diabetes is a very strong risk

factor, the low percent is a considerable quantity too.

The results of the UK prospective diabetes study among 3867 patients with newly diagnosed type 2 diabetes have indicated that therapy with insulin or sulphonylureas over 10 years produced a one-quarter reduction in microvascular disease events, but no clear reduction in macrovascular disease events, although there was a trend toward fewer CHD events in the intensive blood glucose control group.[6]

Another CVD risk factor is a high fat diet and hyperlipidemia. The ordinary diet of about 135 (90%) of the subjects was a high fat diet, including milk and yogurt (>3.5%), red meat and eggs, because most of the patients were farmers and they could obtain these foods easily. The cholesterol level of about 47 (31.3%) of the patients was greater than 220 mg/dL, 87 (57.8%) of them had levels between 200 to 220 mg/dL and 16 (10.9%) had levels less than 200 mg/dL. The amount of LDL in 132(88.4%) was more than 150.

Faucil[13] states that "A restriction in the intake of cholesterol and saturated fats is recommended, as this diet modification may diminish the incidence of arteriosclerosis and its complications".

Furthermore, health-care planning is necessary for HBPC in this population. Sodium intake is another CVD risk factor. Epidemiologic data demonstrated a positive association between sodium intake and blood pressure level. Meta-analysis of clinical trials reveals that a reduction of 75 to 100 mmol in sodium intake lowers blood pressure over periods of several weeks to a few years. These effects are greater for older persons and those with elevated blood pressure.[9]

In this study approximately 93 patients (62.2%) had a regular diet with moderate or high salt intake. There is no significant difference in the average systolic and diastolic blood pressure between patients with high and low sodium intake, although most researches have demonstrated that sodium intake restriction can diminish

Table I: Quantitative variables.

Variable	Mean	Std. Dev.	Minimum	Maximum
Age	58.25	12.36	23.00	94.00
BMI	28.16	5.03	18.60	45.60
Cholesterol	203.60	51.76	111.00	390.00
HDL	41.14	11.30	18.00	70.00
LDL	125.33	44.29	43.00	247.00
Systolic BP	171.47	24.22	90.00	230.00
Diastolic BP	99.31	13.73	70.00	150.00
Trait anxiety	43.28	7.92	28.00	64.00
State anxiety	46.04	6.93	29.00	64.00
Total anxiety	89.38	14.58	55.00	126.00

systolic and diastolic blood pressure. Consequently, salt consumption restriction should be recommended by health-care managers.

Excess weight and abdominal girth are important CVD risk factors. Excessive body weight or a body mass index of 27 or greater is correlated closely with increased blood pressure. The deposition of excess fat in the upper part of the body, as evidenced by a waist circumference of 34 inches (85 cm) or greater in women or 39 inches (98 cm) or greater in men, has also been associated with risk for hypertension, dyslipidemia, diabetes, and CHD mortality.[9]

In this study, the BMI of 74 (49.7%) of the patients was more than 27 and the waist of 127 (85%) of the females was more than 85 cm and in 90 (60%) of the males was above 98 cm. As a result, we can say that half of the patients had excessive weight and two-thirds of them had a high waist index. For this reason health-care planning is necessary for weight reduction. There was only a positive correlation in diastolic blood pressure (mean=99 mmHg; r=0.3; $p<0.01$) with the body mass index (mean=28.18 kg/m^2) of patients. Also, there was a significant difference in the average BMI of females (29.07 kg/m^2) compared to males (25.88 kg/m^2; $p<0.001$).

Njelekela and colleagues[14] based on two studies in Tanzania quoted that "the overall prevalence of obesity (BMI>or = 30 kg/m^2) was higher for women in the most recent survey (22.8%, $p<0.0001$).[14]

The use of contraceptives is another risk factor in women. However, only a small number of the women taking oral contraceptives actually have an increase in arterial pressure to a level greater than 140/90 and, in about half of these, the hypertension will remit within 6 months of stopping the drug.[12]

Almost 46 (31%) of the females had a positive contraceptive consumption history. Its average period was 8.7 years.

In this study, anxiety was the last risk factor, which was considered. The average of trait, state, and total anxiety score were 42.28, 46.06, and 89.37 respectively. There were significance differences in the average trait (male=40.28; female=44.32; $p<0.01$), state (male=41.97; female=46.5; $p<0.001$), and total (male=81.73; female=91; $p<0.001$) anxiety score between the males and females. On the other hand, female anxiety was more than male anxiety. There was a significant difference with the average systolic and diastolic blood pressure between smokers and nonsmokers in males. Also, there was no correlation in the trait, state, and total anxiety score by systolic and diastolic blood pressure.

Emotional stress can raise blood pressure acutely. A study in African Americans showed significant de-creases in systolic and diastolic blood pressure at 3 months.[9]

In this research, approximately 80.3% of the subjects have been treated with anti-hypertensive drugs including methyldopa (50%), beta-blockers (32%), nitrates (6.6%), diuretics (4.2%), ACE inhibitors (3.5%), and calcium channel blockers (3.5%). Despite the high rate of patients treated, which is more than the universal rate of 50%, the blood pressure control level is not acceptable. It is 18.4%, which is less than the universal rate of 25 -30%. According to the health examination survey (1991-94), among 53.6% of the patients treated, about 27.4% were controlled.[9]

The reason of the high rate of people who were treated is the screening program performed during the last two years. Then the hypertensive patients were referred to health centers. Despite the satisfactory tendency of the patients toward treatment, the number of the people controlled is not acceptable. In line with researchers, the low success rate of HBPC is due to the following explanations:

1) The therapeutic strategies include drug use and no drug therapy. The latter is more important in HBPC. As fore-mentioned data demonstrated, the patients were using only the prescribed drug, without paying attention to minimizing and modifying other CVD risk factors. Even though the rate of most of them was high.

2) For medical treatment of HBP, there is an international and scientific protocol that should be considered and applied. According to this research, 50% of the patients used methyldopa which is now omitted as the first drug of choice by reliable scientific authorities.[12] Thus, the patients were not treated by a reliable protocol. In this research, we have found that the average systolic blood pressure in patients who used methyldopa was higher compared to patients using beta-blockers. There was a significant difference between the average systolic blood pressure in patients using methyldopa (181.44 mmHg) and patients using beta blockers (167.5 mmHg; $p<0.04$) .

At the end, because of the above observation and the very low amount of measures and programs that have been undertaken by various countries, it is clear that we should have a new and original procedure profitted by past experiences. In line with this necessity, researchers have recommended a new program called the partnership care model.

Further details of this model will be described in future studies.

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