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# Prevalence, Awareness, Treatment, and Control of Hypertension Among Arab Americans

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**Background:** Hypertension (HTN) is a major risk factor for heart disease, which is the leading cause of death in the United States. Hypertension detection and blood pressure (BP) control are critically important for reducing the risk of myocardial infarction and strokes. Although there are more than 3.5 million Arab Americans in the United States, there are no national or regional data on HTN prevalence among Arab Americans. **Objective:** This study aims to estimate the prevalence of HTN in a community sample of Arab Americans; assess levels of awareness, treatment, and control in hypertensive patients; and describe and compare lifestyle behaviors (eg, physical activity, nutrition, and weight control). **Methods:** In this cross-sectional, descriptive study, 126 participants completed a self-administered questionnaire to measure physical activity, nutrition, and medical history. Height and weight were measured. Three BP measurements were obtained at 60-second intervals after resting for 5 minutes. Hypertension was defined as a mean systolic BP of 140 mm Hg or higher, or a diastolic BP 90 mm Hg or higher, and/or taking antihypertensive medications. **Results:** Overall, 36.5% of participants had HTN and 39.7% had pre-HTN. Among hypertensive participants, only 67.4% were aware of their high BP, and 52.2% were taking antihypertensive medication. Among those taking medication, 46% had controlled BP. The prevalence of HTN was higher in men than in women (45.9% and 23.2%, respectively;  $P = .029$ ) and increased with age ( $P = .01$ ). Hypertensive participants also had higher body mass index (mean, 31.55 kg/m<sup>2</sup>) compared with normotensive participants (mean, 28.37 kg/m<sup>2</sup>;  $P = .01$ ). **Conclusion:** Our results indicate that HTN and pre-HTN are highly prevalent in Arab Americans. Hypertension awareness and control rates were inadequate and low compared with national data. These results emphasize the urgent need to develop public health strategies to improve the prevention, detection, and treatment of HTN among Arab Americans.

**KEY WORDS:** adherence, Arab Americans, hypertension, prevalence

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## Background

Hypertension (HTN) is a major risk factor for heart disease, which is the leading cause of death in the United States.<sup>1</sup> Hypertension is the third leading cause of death in the world, with a mortality rate of 13%.<sup>2</sup> Almost 30% of American adults live with HTN.<sup>3</sup> The estimated cost of HTN in the United States for 2010 was \$174 billion.<sup>4</sup>

Hypertension prevention and treatment have been addressed as national health goals for Healthy People 2020, which include reducing the prevalence of HTN from a baseline of 29.9% to 26.9% and increasing HTN control rate from 43.7% to 61.2%.<sup>5</sup>

Racial/ethnic disparities in awareness and treatment of HTN persist in the United States; this raises a concern, as minority ethnic groups are more likely to develop HTN before the age of 50 years.<sup>1</sup> There are more than 3.5 million Arab Americans in the United States,<sup>6</sup> which represents a new minority ethnic

group to target for the prevention and treatment of HTN because they are at higher risk to develop HTN, based on data from Arabic countries. Only 2 community studies were found that assessed the prevalence of HTN using blood pressure (BP) measurement in Arab Americans nearly 2 decades ago in the Michigan area and yielded prevalence rates ranging from 21% to 23.6%, which was comparable with that of the general US population at that time (24%).<sup>7,8</sup> Data on prevalence rates of HTN in other parts of the world are up-to-date and indicate higher rates of HTN in Arab countries compared with the United States, such as Syria and Morocco. For example, HTN prevalence is 40.6% in Syria,<sup>9</sup> 39.6% in Morocco,<sup>10</sup> and 32.1% in Qatar.<sup>11</sup> Urbanization and industrialization in Arab countries account for changing socioeconomic and environmental status as well as lifestyle behaviors that increase behavioral and biological risk factors.<sup>2,7</sup> Thus, higher prevalence of obesity, physical inactivity, and increased salt and fat intake from consuming processed foods because of urbanization and industrialization are likely explanations for higher HTN prevalence in Arab populations. However, to our knowledge, there are limited national or regional data on the prevalence of HTN among Arab Americans. Thus, the purpose of this study was to estimate the prevalence of HTN and assess levels of awareness, treatment, and control in a community sample of Arab Americans with HTN. In addition, the study was designed to describe and compare lifestyle behaviors (eg, physical activity, nutrition, weight control) among hypertensive, prehypertensive, and normotensive Arab Americans. This study was also designed to obtain a baseline data for future research programs on HTN awareness, prevention, and control among Arab Americans.

The Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7) provides guidelines to prevent and control BP, but the paucity of data on the actual prevalence of HTN, factored in with limited data related to factors that predict HTN in Arab Americans, impacts efforts to prevent and control BP in this ethnic group. Immigration to Western countries is an important environmental risk factor for Arab Americans, who often adopt the Western lifestyle, which can include a sedentary lifestyle and consumption of processed food with high fat and high salt content.<sup>7</sup> The potential role of acculturation (ie, physical inactivity, obesity, stress, consumption of high-fat diets, and smoking) on increasing risks for cardiovascular disease (ie, HTN, coronary artery disease) among Arab Americans living in the United States suggests that HTN may be underreported in this population.<sup>7,8,12-14</sup>

The JNC-7 report<sup>15</sup> classified BP for adults 18 years or older into 3 categories: pre-HTN (BP

120/80–139/89 mm Hg), stage 1 HTN (systolic BP 140–159 mm Hg or diastolic BP 90–99 mm Hg), and stage 2 HTN (systolic BP  $\geq$ 160 mm Hg or diastolic BP  $\geq$ 100 mm Hg). Individuals with pre-HTN are twice as likely as normotensive individuals to develop HTN.<sup>15</sup> Data from the 2005–2006 National Health and Nutrition Examination Surveys (NHANES) showed that 29% of US adults 18 years or older have HTN, and 28% have pre-HTN.<sup>3</sup> The prevalence of HTN is significantly higher among US minorities than among whites.<sup>3</sup> The prevalence of HTN in non-Hispanic blacks, Hispanic Americans, and non-Hispanic whites was 42%, 28%, and 22%, respectively.<sup>3</sup> These findings can be explained by the fact that minorities are often less educated, have lower income, and lack of access to healthcare services as well as other ethnic determinants including genetics and customary dietary practices.<sup>7,16,17</sup> Unfortunately, NHANES does not distinguish Arab Americans from other non-Hispanic whites because US Census classifies Arab Americans as whites. Thus, Arab Americans are included in NHANES data as non-Hispanic whites.

## Methods

### Study Design and Participants

For this descriptive, cross-sectional study, a convenience sample of adult Arab Americans was recruited from various sites in Southern California. Fluency in the English language was not required for participation because the questionnaire was available in both Arabic and English. Arab Americans were identified as those having Arabic-speaking ancestry, including Lebanese, Syrian, Egyptian, Iraqi, Jordanian, Palestinian, Moroccan, Algerian, Bahraini, Djiboutian, Kuwaiti, Libyan, Omani, Qatari, Saudi, Tunisian, Emirate, and Yemeni.<sup>18</sup> Inclusion criteria for this study were (a) male or female Arab American, (b) resident of Southern California, and (c) 18 years or older. Participants were excluded if they had psychological or cognitive impairments or were pregnant. During the informed consent disclosure, all participants were screened to ensure adequate ability to understand the information disclosed and to sign the consent form. Pregnancy was determined by self-report during the informed consent process; pregnant women were excluded because pregnancy can induce transient HTN in normotensive women.

Sample size calculations were performed by Sample Size Calculator for Prevalence Studies.<sup>19</sup> Assuming that HTN prevalence in this population was similar to the 26% reported prevalence in the state of California, we found that a sample size of 116 was sufficient to achieve a 95% confidence interval for the prevalence ( $\pm$ 8%) in this population.

A total of 140 participants were recruited. Ten participants refused to participate during the consent process because they did not have time to complete the study, 1 participant was excluded because she was pregnant, and 3 participants did not complete the questionnaire and health measurements (see Figure 1). The overall response rate was 90% (126 participants).

### Procedures

The University of California, Los Angeles, Institutional Review Board approved the study protocol, and all participants provided informed consent to participate in the study. Participants were recruited through flyers in worship places and community centers, referrals from religious and community leaders, and word-of-mouth in Orange and Los Angeles counties.

Participants had their BP, weight, and height measured by the researcher. Blood pressure was measured using the OMRAN HEM-705CP automatic BP monitor (HEM-705CP, Omron Corporation, Tokyo, Japan) according to American Heart Association 2005 protocol and recommendations. Participants were seated for 5 minutes; 3 BP measures were obtained at 60-second intervals; and the average was recorded. All mea-

surements were made on the left arm, which was placed at the level of the heart with a cuff adapted to the arm circumference. The final BP result was the arithmetic mean of the 3 measurements taken on the same arm and rounded to the nearest 1 mm Hg. The OMRAN HEM-705CP automatic BP monitor was validated using the protocols of Association for the Advancement of Medical Instrumentation and the British Hypertension Society.<sup>20</sup>

Body mass index (BMI) was used to assess normal weight, overweight, and obesity in this study. Body mass index measures body fat based on height and weight calculation; that is, weight in kilograms divided by the square of height in meters (weight/height<sup>2</sup> [kg/m<sup>2</sup>]).<sup>21</sup> With participants wearing light clothing and no shoes, weight was measured to the nearest 0.2-lb increments up to 330 lb using the Omron HB-40 Fat Monitor and Scale (HB-40, Omron Corporation). To ensure the reliability of weight measurements, scales were calibrated before each weight measurement to reduce reader error. Height was measured by a stadiometer, with the participant not wearing footwear. This device designed to assess height to the nearest 0.5 cm.

After the health status measures were taken, patients were asked to complete a series of questionnaires (average completion time of 30–40 minutes). Demographic information was collected through self-administered questionnaires. This information included age, gender, marital status, years of residence in the United States, educational level, employment, income, and health insurance. Personal health information was also obtained (eg, smoking, alcohol consumption, and medical history).

Physical activity and nutrition were measured using the Health Promoting Lifestyle Profile II (HPLP-II). The HPLP-II is a 52-item scale that measures health promotion behaviors in 6 domains: health responsibility, spiritual growth, physical activity, nutrition, interpersonal relations, and stress management. It is a self-administered questionnaire with a 4-point response format (1 = never, 2 = sometimes, 3 = often, 4 = routinely). The HPLP-II was translated by bilingual/bicultural translators and was tested for cultural appropriateness in Arab Americans.<sup>13,22</sup> The HPLP-II has very well-established reliability. However, this study used only physical activity and nutrition subscales to measure healthy lifestyle behaviors. Cronbach  $\alpha$  coefficients for physical activity and nutrition subscales for this study sample were .81 and .73, respectively.

### Definitions

Blood pressure categories were defined according to the guidelines of the JNC-7 report. Hypertension was

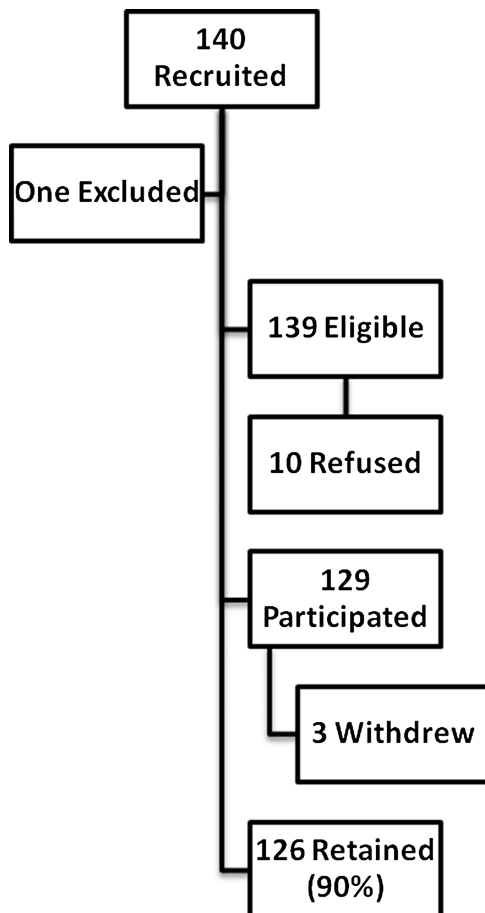


FIGURE 1. Flowchart of sample recruitment and retention.

defined as an average systolic BP of greater or equal to 140 mm Hg, or an average diastolic BP equal to or greater than 90 mm Hg, and/or self-reported current use of antihypertensive medications. *Prehypertension* was defined as an average systolic BP of 120 to 139 mm Hg or diastolic BP 80 to 89 mm Hg and not currently taking antihypertensive medications. *Awareness of HTN* was defined by self-report of any previous diagnosis of HTN by a healthcare professional among hypertensive participants. *Treatment* was defined as the use of antihypertensive medications at the time of the study. *Control of HTN* was defined as current use of antihypertensive medication associated with an average BP lower than 140/90 mm Hg. For individuals with diabetes, HTN control was defined as an average BP lower than 130/80 mm Hg. The JNC-7 report recommends maintaining normal body weight (BMI 18.5–24.9 kg/m<sup>2</sup>) for better control of BP.<sup>15</sup> *Overweight* was defined as a BMI of 25 to 29.9 kg/m<sup>2</sup>, and *obesity*, as a BMI of 30 kg/m<sup>2</sup> or greater.<sup>21</sup>

### Data Analysis

Data were analyzed using SPSS 16.0 for Windows (SPSS Inc, Chicago, Illinois). The demographic characteristics of the participants were analyzed using descriptive statistics, including means and standard deviations or  $\chi^2$ , depending on the level of measurement. The bivariate relationships between BP status, sample characteristics, and risk factors were examined using the  $\chi^2$  test or Spearman correlation coefficient. To determine the significant difference between the 3 age groups in HTN status, post hoc analysis was conducted. To compare lifestyle behaviors (eg, physical activity, nutrition, and weight control) among hypertensive, prehypertensive, and normotensive Arab Americans, between-subjects multivariate analysis of variance was performed on 3 dependent variables: physical activity, nutrition, and BMI. Using an  $\alpha$  level of .001 to evaluate homogeneity assumptions, we found that the Box M test of homogeneity of covariance and the Levene homogeneity of variance test were not statistically significant, which means that the homogeneity of variance assumption was not violated. A .05 criterion for statistical significance was used for all analyses.

## Results

### Characteristics of Study Participants

A total of 126 Arab Americans participated in the study. The mean age of the participants was 41.75 years (range, 18–74 years). Participants were predominantly men (58.7%) and married (76.2%), had university or postgraduate degrees (58%), and had health insurance (75.4%). The sample consisted of 27%

Jordanians, 26.2% Palestinians, 13.5% Egyptians, 9.5% Lebanese, and other Arabs (23.8%). The length of residence in the United States ranged from 1 to 40 years (mean, 14.95 years). For HTN risk factors, 11.1% reported current smoking, 11.1% had diabetes, 47.7% were obese, and 5.6% drank alcohol regularly. In addition, the mean BMI was 29.77 kg/m<sup>2</sup> (range, 19.3–44.7 kg/m<sup>2</sup>). Table 1 provides a comparison of demographic and HTN risk factors among the 3 BP categories.

### Prevalence of Hypertension

Overall, the prevalence of HTN was 36.5%, and the prevalence of pre-HTN was 39.7%. The prevalence of HTN was significantly higher in men than in women (45.9% and 23.2%, respectively;  $P < .05$ ). Hypertension prevalence was higher in participants 60 years or older (87.5% among those aged  $\geq 60$  years vs 33% in participants  $< 60$  years old). To determine the significant difference between the 3 age groups in HTN status, post hoc analysis was conducted. Tukey post hoc comparisons of the 3 age groups indicated that HTN status among the age group 18 to 39 years differed significantly from HTN status among the other 2 age groups ( $P < .01$ ). The prevalence of pre-HTN was significantly higher in participants aged 18 to 39 years (43%), in men (52%), and in overweight participants (58%). Hypertension prevalence was positively associated with older age ( $r = 0.41$ ,  $P < .001$ ), being male ( $r = 0.23$ ,  $P < .01$ ), and having a higher BMI ( $r = 0.29$ ,  $P < .01$ ). There was no significant gender difference in BMI levels.

### Awareness, Treatment, and Control of Hypertension

Twenty-six percent of the participants (71% of men and 29% of women) reported high BP identified by a healthcare provider. The majority (67.4%) of participants with diagnosed HTN by a healthcare provider were aware of their high BP, but only 52.2% were taking antihypertensive medications (70% monotherapy, 30% combination therapy). Among those taking medication, 46% had controlled BP (91% of men and 9% of women). The highest level of treatment and control of HTN was seen in men aged 40 to 59 years (63.6%), whereas all hypertensive women aged 18 to 39 years had uncontrolled BP.

### Comparison of Healthy Lifestyle Behaviors

Using Wilks Lambda criteria in the multivariate test of differences between hypertensive, prehypertensive, and normotensive groups, the analysis of the combined lifestyle behaviors scores resulted in statistically significant main effects ( $F_{10, 238} = 2.115$ ,  $P = .024$ ).

**TABLE 1** Comparison of Demographic and Hypertension (HTN) Risk Factors Among the Three Blood Pressure Categories

Variables	Total (N = 126)	HTN (n = 46)	Pre-HTN (n = 50)	Normotension (n = 30)	$\chi^2$	P
Age, y						
18–39	51 (40.5)	7 (15.2)	22 (44.0)	22 (73.3)	30.79	.00
40–59	67 (53.2)	32 (69.6)	27 (54.0)	8 (26.7)		
≥60	8 (6.3)	7 (15.2)	1 (2.0)	0 (0.0)		
Gender					7.11	.029
Male	74 (58.7)	34 (73.9)	26 (52.0)	14 (46.7)		
Female	52 (41.3)	12 (26.1)	24 (48.0)	16 (53.3)		
Education					2.55	.28
High school or less	27 (21.4)	9 (19.6)	14 (28.0)	4 (13.3)		
College or higher	99 (78.6)	37 (80.4)	36 (72.0)	26 (86.7)		
Marital status					2.0	.37
Married	96 (76.2)	36 (78.3)	35 (70)	25 (83.3)		
Not married	30 (23.8)	10 (21.7)	15 (30)	5 (16.7)		
Length of US residency, y					8.13	.087
<10	38 (30.2)	13 (28.3)	17 (34.0)	8 (26.7)		
10–19	43 (34.1)	12 (26.1)	15 (30.0)	16 (53.3)		
≥20	45 (35.7)	21 (45.7)	18 (36.0)	6 (20.0)		
Employment					1.49	.47
Employed	73 (58.4)	30 (65.2)	26 (53.1)	17 (56.7)		
Not working	52 (41.6)	16 (34.8)	23 (46.9)	13 (43.3)		
Monthly income					1.51	.83
<\$2500	48 (40.3)	17 (39.5)	21 (44.7)	10 (34.5)		
\$2500–\$5000	40 (33.6)	13 (30.2)	16 (34.0)	11 (37.9)		
>\$5000	31 (26.1)	13 (30.2)	10 (21.3)	8 (27.6)		
Having health insurance	95 (75.4)	34 (73.9)	38 (76.0)	23 (76.7)	0.090	.96
BMI, kg/m <sup>2</sup>					20.63	.00
<25	18 (14.3)	5 (10.9)	6 (12.0)	7 (23.3)		
25–29	48 (38.1)	8 (17.4)	28 (56.0)	12 (40.0)		
≥30	60 (47.6)	33 (71.7)	16 (32.0)	11 (36.7)		
Current smoker	14 (11.1)	6 (13)	6 (12)	2 (6.7)	9.67	.14
Drink alcohol	7 (5.6)	4 (8.7)	2 (4)	1 (3.3)	3.6	.73
Having diabetes	14 (11.1)	10 (21.7)	4 (8.0)	0 (0)	9.501	.01

Abbreviation: BMI, body mass index.  
Data are presented as n (%).

However, the magnitude of effect sizes was small (partial  $\eta^2 = 0.082$ ). To investigate the statistically significant multivariate effects, univariate analysis of variance tests were conducted on each individual dependent variable. For BMI, there was a significant main effect for HTN status ( $F_{2, 123} = 5.492$ ,  $P = .005$ , partial  $\eta^2 = 0.082$ ). Hypertensive participants had significantly higher BMI levels (mean, 31.55 kg/m<sup>2</sup>) compared with prehypertensive (mean, 28.97 kg/m<sup>2</sup>) and normotensive (mean, 28.37 kg/m<sup>2</sup>) participants. This was a small difference (partial  $\eta^2 = 0.082$ ). For physical activity and nutrition, the main effect for HTN

status was not statistically significant. Thus, HTN status comparisons revealed that only BMI level was significantly different for each group (Table 2). These differences can be clearly seen in Figure 2, which depicts the mean BMI level of each of the 3 groups.

## Discussion

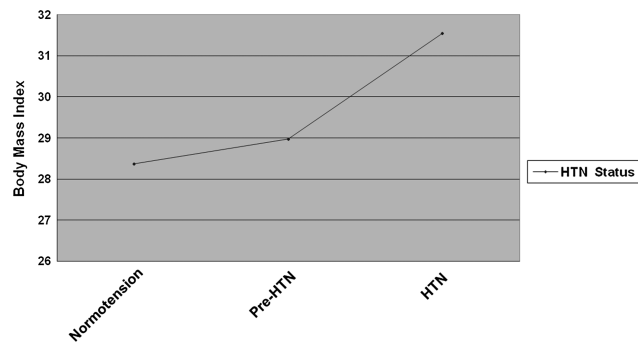
The sample demographic characteristics are similar to those of other studies of Arab Americans in Southern California, where most participants were young, were married, had college or higher education, and had

**TABLE 2** Multivariate Analysis of Variance to Compare Lifestyle Behaviors in Hypertensive, Prehypertensive, and Normotensive Participants

Variables	Hypertensive, Mean	Prehypertensive, Mean	Normotensive, Mean	n	F	P
Physical activity	1.82	1.90	1.82	123	0.32	.725
Nutrition	2.58	2.49	2.50	123	0.39	.677
BMI	31.55	28.98	28.37	123	5.79	.004 <sup>a</sup>

Abbreviation: BMI, body mass index.

<sup>a</sup> $P < .01$ .



**FIGURE 2.** Means of body mass index for hypertensive, prehypertensive, and normotensive participants. Abbreviation: HTN, hypertension.

lived in the United States for more than 14 years.<sup>13,22,23</sup> The sample was fairly young (mean age, 41.75 years; median, 41 years); however, in comparison with the Arab American population (median, 33.1 years) and the US population (median, 36.4 years),<sup>22</sup> the sample was slightly older, which can be explained by including only adult participants in the study.

Overall, the results indicate that the prevalence of HTN and pre-HTN in Arab Americans is higher than the national prevalence rate (36.5% vs 29% and 39.7% vs 28%, respectively).<sup>3</sup> Because the US census does not distinguish Arab Americans from other non-Hispanic whites, HTN prevalence in Arab Americans should be compared with that in non-Hispanic whites. Therefore, HTN is more common in Arab Americans than in whites (36.5% vs 29%). Data from the 2005–2006 NHANES indicate that the prevalence of HTN is significantly higher among ethnic minorities than among whites. In this study, HTN prevalence was comparable with the prevalence of HTN in African Americans, who have the highest HTN prevalence in the United States (36.5% vs 41%).

There are no recent studies on Arab American's HTN status with which to compare our findings. Two studies conducted on Arab American communities in Michigan in 1995 and 1997 showed that the prevalence of HTN ranged from 21% to 23.6%, which was comparable with that of the general US population at that time (24%).<sup>7,8</sup>

Compared with studies from other parts of the world, the prevalence rate of HTN was comparable with those in Syria, Qatar, United Arab Emirates, and Morocco, which range from 32.1% to 40.6%.<sup>9,11,24,25</sup> The prevalence of HTN varied by age and gender in this study. The prevalence of HTN increased with age, which is consistent with data from the 2005–2006 NHANES and studies from Arabic countries.<sup>3,7,9–11,25–31</sup> In addition, our data showed that HTN was more prevalent in men compared with women. A study conducted by the NHANES investigators showed contradictory findings; the prevalence of HTN was about equal between men and women.<sup>3</sup> However, NHANES

data indicate that HTN prevalence is higher among men than women until 45 years of age and similar from 45 to 64 years of age.<sup>3</sup> Our findings can be attributed to the fact that almost 90% of participants in our study aged 60 years or older were men, and HTN was very prevalent in this age group (87.5%).

These data showed lower levels of awareness, treatment, and control of HTN compared with the national rates of awareness, treatment, and control of HTN (78%, 68%, and 64%, respectively).<sup>3</sup> Particularly, almost half of hypertensive participants were not adherent to their prescribed antihypertensive medications. Factors that contribute to lack of adherence to treatment include antihypertensive drug side effects, disease-specific factors such as the asymptomatic nature of HTN, access to treatment and healthcare services, and patient knowledge of and attitude toward HTN.<sup>32</sup> Our findings suggest that hypertensive Arab Americans are less likely to be aware of their condition or to be treated compared with their American counterparts. In addition, our data indicate that two-thirds of women with diagnosed HTN were taking medication ( $n = 6$ ) but only 9% of them were getting their BP controlled ( $n = 1$ ). This can be explained by the fact that all women were taking only 1 antihypertensive medication whereas 39% of men were taking 2 to 4 antihypertensive medications to control their BP. Moreover, the number of women who were taking BP medications was very small ( $n = 6$ ). Thus, future research should focus on Arab American women to clarify this issue and examine HTN treatment and control rate.

These data suggest that the high prevalence of HTN and pre-HTN may be related to higher BMI of the participants. The prevalence of obesity in this study (47.6%) was higher than national prevalence (34.3%)<sup>4</sup> but similar to rates documented in Arab Americans (51%).<sup>33</sup> The high rates of obesity may in part be explained by differences in lifestyle behaviors between individuals belonging to the Arabic culture, because being overweight is regarded as a sign of wealth in some Arab societies. Other risk factors for

HTN in this study were sedentary lifestyle and unhealthy diet. Eighty-six percent of participants were not physically active, and 47.6% reported unhealthy diets. Poor dietary adherence has been linked with the tendency of Arab Americans to adopt the Western lifestyle, which can include sedentary lifestyle and consumption of processed food with high fat and salt content.<sup>7,16</sup> Our findings support the Centers for Disease Control and Prevention call that racial/ethnic disparities in awareness and treatment of HTN persist in the United States and that more public health efforts are needed to close the health disparity gap. Healthcare providers should provide culturally sensitive care that highlights the importance of lifestyle modifications to prevent or control HTN because the Arab culture supports individual efforts to prevent illness and change behaviors to produce positive health outcomes.<sup>34</sup> In addition, the Arab culture encourages patients to respect authority and the social order of healthcare providers, and they expect healthcare providers to make decisions for them.<sup>34-35</sup> Thus, healthcare providers should spend more time to facilitate healthcare decision making that includes promoting lifestyle modifications and treatment plan. In this case, patients will try to respect healthcare provider authority and adhere to the treatment plan. Providing written instructions and explanations about treatment and self-care in the language that the client prefers (Arabic or English) will serve to enforce this commitment and adherence. In addition, healthcare providers should encourage Arab Americans to maintain healthy ethnic traditions such as the Mediterranean diet, which is the traditional diet of most of Arab Americans.<sup>7,34</sup> The Mediterranean diet, also known as heart-healthy diet, emphasizes fresh fruits and vegetables, healthy fat (eg, olive oil), nuts, and whole grains. Finally, physical activity is seen as a task-related activity in Arab culture.<sup>8</sup> Thus, instead of focusing on intentional physical exercise, patients can be encouraged people to walk, use the stairs instead of elevators, and engage in gardening.

## Limitations

These findings should be interpreted in light of several limitations. The study was designed to study HTN status in a community sample of Arab Americans in Southern California using a convenience sample, which increased the risk for sample and selection bias. In addition, the sample size was inadequate to estimate the prevalence of HTN in an Arab American population. Thus, these results may not be generalizable to all Arab Americans. Like other observational studies, BP measurements were taken at a single point in time, differing from standard diagnostic guidelines; therefore, findings may overestimate HTN and pre-HTN prevalence. In addition, the final BP result was

based on the arithmetic mean of the 3 BP measurements, whereas some methods use the average of the last 2 measurements. However, both methods are acceptable in observational studies to report HTN prevalence. In this study, data analysis showed no significant differences between the 2 BP averaging methods. Finally, measurements of HTN awareness, HTN risk factors, and use of antihypertensive medications were based on self-reports; therefore, estimates may be biased. Based on these limitations, our findings can be fairly generalizable and applicable to the Arab American community in Southern California only.

Despite these limitations, our findings provide the first community-based data of HTN status in Arab Americans in California and emphasize that more efforts and initiatives should be made to develop programs that can be implemented in community settings to increase community awareness, control, and treatment of HTN and to decrease health disparities among this ethnic minority group.

## Conclusion

This study provides the first community-based study among Arab Americans in Southern California that estimates the prevalence of HTN awareness, treatment, and control. Our data show that HTN is a major health problem among Arab Americans and highlight the urgent need to develop public health strategies for prevention and treatment of HTN. Given the high prevalence of HTN and pre-HTN along with low awareness, treatment, and control rates, it is expected that the prevalence of HTN will continue to increase in the near future as the population ages. Blood pressure screening and interventions should start early in this population to prevent HTN because pre-HTN and overweight are very prevalent in young Arab Americans (18–39 years). The study findings set new priorities for future research of this ethnic group. Emphasis must be placed on incorporating the study findings into culturally sensitive screening and detection efforts and on designing community-based interventions to explore and emphasize Arab Americans' perceptions about their risk of getting HTN and its complications. Nurses can be instrumental into educating the public and developing and implementing strategies for HTN screening and self-management. Nurses are approachable, accessible, and effective in counseling and helping individuals to develop the knowledge and skills needed to adopt lifestyle behaviors and to reinforce treatment adherence. Successful efforts and initiatives with Arab Americans will support and guide other research programs that target HTN screening and awareness among ethnic minorities.



### What's New and Important

- Hypertension (HTN), pre-HTN, and obesity are prevalent in Arab Americans.
- Hypertensive Arab Americans are less likely to be aware of their condition or to be treated compared with their American counterparts.
- Public health strategies must be developed to improve the prevention, detection, and treatment of HTN among Arab Americans.

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