ABSTRACT

Background: Compared with older adults, young adults exhibit poor treatment and control of hypertension. However, little is known about the factors affecting the treatment and control of hypertension in young adults.

Purpose: This study was aimed to identify the factors affecting the treatment and control of hypertension in early adulthood by gender in South Korea.

Methods: This secondary data analysis study used a data set from the Korean National Health and Nutrition Examination Survey. The inclusion criteria were as follows: (a) 19–44 years old and (b) having an indicator of hypertension (systolic blood pressure ≥ 140 mmHg, diastolic blood pressure ≥ 90 mmHg, or taking antihypertensive drugs). Seven hundred eighty participants were included in this study. The odds ratios and 95% confidence intervals were derived using composite-sample multiple logistic regression.

Results: In men, age, marital status, family history of hypertension, treatment of hyperlipidemia, abdominal obesity, high-sodium diet, cholesterol, and aerobic exercise were found to be associated with hypertension treatment and control. In women, age, employment status, cardiovascular risk factors, body mass index, high-sodium diet, and drinking were found to be associated with hypertension treatment and control.

Conclusions: The factors affecting the treatment and control of hypertension differed between the two genders. Therefore, health-care providers should consider the differences in the factors between the two genders in early adulthood. To improve the treatment and control of hypertension, the guidelines for treatment interventions and management should be gender-specific from early adulthood. Nurses should actively suggest health-related behavioral modifications such as performing aerobic exercise for young adult men and reducing alcohol consumption for women.

KEY WORDS: hypertension, treatment, control, young adult, gender.

Introduction

The estimated global rate of hypertension in 2015 was 24.1% for adult men and 20.1% for adult women (World Health Organization, 2017). High blood pressure (BP) is a major risk factor for the development of ischemic heart disease, which increases the mortality rate (Hales, Carroll, Simon, Kuo, & Ogden, 2017; Pfeffer, 2017). Previous longitudinal studies have associated the increase in treatment for hypertension with an increase in the number of patients achieving BP control (Yoon et al., 2015; Zhang & Moran, 2017). Therefore, maintaining normal BP levels through appropriate treatment is important to reduce cardiovascular disease and mortality (Law, Morris, & Wald, 2009; Pfeffer, 2017).

However, many individuals with hypertension are not effectively treated, and their BP is not controlled to an adequate level. Recent studies have reported a difference between the treatment and control of BP (Hales et al., 2017; Rohla, Haberfeld, Tscharre, Huber, & Weiss, 2016; Zhang & Moran, 2017). Therefore, there is a need to improve our understanding of the factors that affect the treatment and control of hypertension (Hales et al., 2017; Merai et al., 2016). Young adults have poorer treatment and control of hypertension than their older counterparts (Zhang & Moran, 2017). According to a previous study, the hypertension control rates in early adulthood (18–44 years old) and older adulthood (45 years old and above) were 40.9% and 52.4%, respectively (Gillespie, Hurvitz, Centers for Disease Control and Prevention, & National Center for Health Statistics, 2013).

In South Korea, the prevalence of hypertension among adults ≥ 18 years old is lower than those in Austria, the United Kingdom, and the United States (World Health Organization, 2017). However, the treatment and control efficacy in South Korea is not optimal. The United States, with the highest rate of hypertension management, had a treatment rate of 71.6% in 2010, compared with 52.2% in South Korea. Likewise, the control rate of hypertension in South Korea was 28.9% compared with 46.5% in the United States and was significantly lower among Korean adults aged 19–44 years (Guo, He, Zhang, & Walton, 2012; Moon et al., 2013). The hypertension treatment rate was 13.4%–16% and the hypertension control rate was 9.2%–11.6% among Korean young adults (30–39 years old; Korea Centers for Disease Control & Prevention [KCDC], 2019).
Because high BP in young adults is associated with a higher risk of cardiovascular diseases and early mortality (Gray, Lee, Sesso, & Batty, 2011; Fletcher, Vittinghoff, Thanataveerat, Bibbins-Domingo, & Moran, 2016), its treatment and control in early adulthood are important (Zhang & Moran, 2017). Furthermore, the identification of factors that affect the treatment and control of hypertension is critical to the development of effective intervention strategies (Park, Kim, Jang, & Koh, 2012). However, little is known about the factors affecting the treatment and control of hypertension in early adulthood.

Previous studies in the overall population or in older adults have reported sociodemographic factors, health status (diabetes mellitus [DM], hyperlipidemia), health-related behavioral choices (smoking, drinking), and obesity status as being associated with controlling and treating hypertension (Park et al., 2012; Park, Ryu, Kim, & Cho, 2016; Rohla et al., 2016). However, few studies have explored these associated factors comprehensively in young adults. Thus, more research is needed in this area. Factors that have been associated with controlling and treating hypertension, including demographic factors, socioeconomic factors, physical health-related factors, health behavior, obesity, lipid profile, and nutritional habits, are analyzed in this study using a sample of young adults.

Other studies (Hales et al., 2017; Ong, Tsao, Lam, & Cheung, 2008) have suggested that the treatment and control of hypertension differ by gender. Therefore, gender differences should be considered when planning future studies (Ramirez & Sullivan, 2018). To gain an in-depth understanding of hypertension, as well as its treatment and control, it is necessary to study the two genders separately (Park et al., 2016; Ramirez & Sullivan, 2018). Nevertheless, only a few studies have examined the factors that affect the treatment and control of hypertension based on gender. Therefore, this study was developed to identify the factors affecting the treatment and control of hypertension based on gender differences in young adults (19–44 years old) in South Korea.

**Methods**

**Study Design**

This secondary analysis study was designed to investigate and compare the factors related to the treatment and control of hypertension in young adults by gender. The samples used in this study were drawn from the 2010–2015 Korean National Health and Nutrition Examination Survey (KNHNES) database.

**Data Collection for the Korean National Health and Nutrition Examination Survey Database**

The KNHNES database includes descriptive statistics on the health and nutritional status of the general Korean population and related trend information. The sampling units are households from the National Census Registry, which were selected using a stratified, multistage, clustered probability sampling of the noninstitutionalized population. Randomly selected households received a letter from the KCDC introducing the KNHNES. Then, trained interviewers visited these households to schedule the survey and health examinations. During the home visit, the nutritional survey was conducted with a computer-assisted personal interview. Informed written consent was first obtained, and the interview and health examinations were performed in a specially designed examination bus. The interview gathered information on demographics, comorbid conditions, and medical history. Nutritional and health information related to smoking and physical activity was collected using self-administered questionnaires. The health examinations included a measurement of BP, weight, height, and laboratory tests. Between 2010 and 2015, 48,481 subjects participated in the KNHNES (KCDC, 2016).

**Subject Selection Criteria**

The inclusion criteria for this study were as follows: (a) 19–44 years old and (b) having an indicator of hypertension (systolic BP [SBP] ≥ 140 mmHg, diastolic BP [DBP] ≥ 90 mmHg, or taking antihypertensive drugs). BP was measured at the examination bus three times consecutively, and the average of the second and third measurements was recorded. The exclusion criteria for this study were as follows: (a) missing BP measurement records and (b) missing any variable record. Among the 48,481 KNHNES participants, 780 subjects satisfied the selection criteria, and their data were used in the subsequent analysis.

**Variables**

**Demographics**

Age, gender, marital status, family type, work status, level of education, medical security, health insurance status, and household income were evaluated in this study. Work status distinguished among nonphysical worker, physical worker, and unemployed (included housewife, student) categories. Monthly household income was distinguished among low, middle low, middle high, and high level categories based on the income quartile in South Korea.

**Health-related characteristics**

Perceived health status, awareness of stress, family history of hypertension, DM, treatment of DM, hyperlipidemia, treatment of hyperlipidemia, and other chronic diseases were all included in this study. Perceived health status was scored based on the response to “What do you think of your general health?” with 1 = very good and 5 = very bad. The perceived stress level was graded as follows: 1 = feeling very stressed, 2 = feeling moderately stressed, 3 = feeling little stress, and 4 = feeling almost no stress, with a 1 or 2 considered positive for perceived stress and a 3 or 4 considered negative for perceived stress. DM and hyperlipidemia were defined based on a doctor’s diagnosis. Treatment of DM and hyperlipidemia was defined as taking drugs for DM currently. Other chronic
diseases studied included stroke, myocardial infarction, angina pectoris, renal failure, and depression based on a doctor’s diagnosis.

**Health behaviors**

Drinking, smoking, and physical activities were evaluated in this study. On the basis of the response to “How much do you drink alcohol at a time regardless of the liquor type?”, the drinking quantity was classified into less than or equal to two cups and more than or equal to three cups, with one cup defined as containing about 8 g of pure alcohol. High-risk drinking frequency was divided into less than once a week and more than once a week based on the response to “How many times do you drink alcohol more than or equal to 7 cups (or 5 cans of beer) for males or 5 cups (or 3 cans of beer) for females regardless of liquor type at a time?” Participants who answered the question “How often do you smoke currently?” with “every day” or “occasionally” were considered smokers, whereas those who answered with “quit” or “never” were considered nonsmokers. Aerobic exercise was considered positive if the participant was rated in the “engaging in intense physical activity” or “engaging in moderate physical activity” categories on the validated International Physical Activity Questionnaire (Oh, Yang, Kim, & Kang, 2007). Walking was considered positive if the response to “How many days in the last week did you walk for at least 10 minutes?” was more than 5 days for over 30 minutes.

**Obesity and serum lipid/glucose**

Obesity was measured using body mass index (BMI) and waist circumference. BMI was calculated after measuring the height and weight using the formula of weight ÷ (height × height; kg/m²). BMI of more than 25 kg/m² was classified as obese, and a waist circumference of ≥ 90 cm for men and ≥ 80 cm for women was classified as abdominal obesity (World Health Organization, 2000). For dyslipidemia, total cholesterol, triglyceride, and high-density lipoprotein (HDL) cholesterol were measured after fasting for more than 8 hours. Total cholesterol over 240 mg/dl was defined as hypercholesterolemia, whereas low-density lipoprotein (LDL) cholesterol ≥ 160 mg/dl was considered hyper-LDL cholesterol. Triglyceride ≥ 200 mg/dl was considered hypertriglyceridemia, whereas HDL cholesterol < 40 mg/dl (men) or < 50 mg/dl (women) was considered low-HDL cholesterolemia (Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults, 2001).

**Daily nutrition intake**

The amounts of sodium, potassium, and calcium intake were recorded from the daily nutrition intake data of KNHNES. Sodium intake ≥ 2.4 g/day was considered high, whereas potassium and calcium intakes of < 3.5 g/day and < 750 mg/day, respectively, were considered low (Geleijnse, Kok, & Grobbee, 2004).

**Treatment and control of hypertension**

Hypertension is operationally defined as having SBP > 140 mmHg or DBP > 90 mmHg or being currently treated with antihypertensives. Treatment of hypertension is defined in the KNHNES as taking antihypertensive medication for 20 days or more per month. Controlled hypertension was defined as SBP < 140 mmHg and DBP < 90 mmHg (KCDC, 2016).

**Ethical Considerations**

Institutional review board (IRB) approval for this study was obtained from the IRB of the KCDC (IRB Approval No. I2013-12EXP-03-5C).

**Data Analysis**

Collected data were analyzed by composite sampling data methods using SAS 9.4 (SAS, Cary, NC, USA). Weighted proportion, mean, and standard errors of study variables are presented in the tables. The relationships between the study variables and hypertension treatment and control were assessed using a composite-sample t test and a cross-analysis test. Multiple logistic regression for the composite samples was used to identify covariates with hypertension treatment and control. The full model was constructed using the variables that were significantly associated in the composite-sample t test and chi-square tests with treatment and control of hypertension. Backward elimination with a p value of .05 was used to identify the final model. Odds ratios (ORs) and 95% confidence intervals were derived using composite-sample multiple logistic regression.

**Results**

Of the 780 participants with hypertension, 390 were men and 190 women. About 11.3% of the men and 26.2% of the women were currently receiving treatment for hypertension. Hypertension was controlled in 7.4% of the men and 18.4% of the women (Table 1).

**General Characteristics by Treatment or Control of Hypertension**

In men, the mean age and proportion of married participants were higher in the treated and controlled group than the untreated and uncontrolled group (p < .001). In women, the mean age of the treated and controlled group was higher than in the untreated and uncontrolled group (p < .001). In addition, unemployment was lower in the controlled group than in the uncontrolled group (p = .038; Table 2).

**Physical-Health-Related Characteristics and Health Behaviors by Treatment or Control of Hypertension**

In men, the proportion of participants with a family history of hypertension, treatment of diabetes, hyperlipidemia, treatment of hyperlipidemia, and other chronic diseases was higher in the treated group (p < .001) than in the untreated group.
addition, the proportion of male participants with a family history of hypertension, hyperlipidemia, treatment of hyperlipidemia, and other chronic diseases and the proportion of male participants doing aerobic exercise were higher in the controlled group \((p < .01)\) than in the uncontrolled group.

In women, the treated group had poorer perceived health status; higher prevalence of diabetes, dyslipidemia, and other chronic diseases; and lower frequencies of high-risk drinking than the untreated group \((p < .05)\). However, the proportion of male participants with hyper-LDL cholesterolemia was lower in the treated group \((p = .016)\). The mean serum cholesterol and the proportion of male participants with high sodium intake were lower in the controlled group \((p < .05)\) than in the uncontrolled group. The controlled group also had a higher mean waist circumference \((p = .025)\) than the uncontrolled group.

In women, obesity, mean BMI, and waist circumference were also higher in the treated group than in the untreated group. However, the proportion of female participants with hyper-LDL cholesterolemia was lower in the treated group \((p < .05)\) than in the untreated group. The proportions of female participants with hyper-LDL cholesterolemia and high sodium intake were lower in the controlled group \((p < .05)\); Table 4) than in the uncontrolled group.

### Obesity, Lipid Profile, and Daily Nutrition Intake by Treatment or Control of Hypertension

In men, the treated group had a higher proportion of participants with abdominal obesity, hypercholesterolemia, and low-HDL cholesterolemia and a higher mean waist circumference \((p < .05)\) than the untreated group. In addition, men in the treated group had lower mean serum cholesterol levels than their untreated group peers \((p < .05)\). However, the proportion of male participants with hyper-LDL cholesterolemia was lower in the treated group \((p = .016)\). The mean serum cholesterol and the proportion of male participants with high sodium intake were lower in the controlled group \((p < .05)\) than in the uncontrolled group. The controlled group also had a higher mean waist circumference \((p = .025)\) than the uncontrolled group.

In women, obesity, mean BMI, and waist circumference were also higher in the treated group than in the untreated group. However, the proportion of female participants with hyper-LDL cholesterolemia was lower in the treated group \((p < .05)\) than in the untreated group. The proportions of female participants with hyper-LDL cholesterolemia and high sodium intake were lower in the controlled group \((p < .05)\); Table 4) than in the uncontrolled group.

### TABLE 1.

**Weighted Prevalence of Participant General Characteristics and Treatment and Control of Hypertension Status**

| Variable                      | Total (\(N = 780\)) | Men (\(n = 590\)) | Women (\(n = 190\)) | \(\chi^2/t\) | \(p\) |
|-------------------------------|----------------------|-------------------|---------------------|-------------|------|
| **General characteristics**   |                      |                   |                     |             |      |
| Age (years; \(M\ \text{and SD}\)) | 36.0 0.3 | 35.5 0.3 | 38.5 0.6 | 5.59 | .018 |
| 19-29                         | 112 21.1 | 96 22.8 | 16 12.6 | 20.90 | < .001|
| 30-39                         | 321 38.5 | 252 39.7 | 69 32.9 |             |      |
| 40-44                         | 347 40.4 | 242 37.5 | 105 54.6 |             |      |
| Education                     |                      |                   |                     | 8.83 | .003 |
| Middle school or less         | 32 3.7 | 15 2.8 | 17 8.1 |             |      |
| High school or more           | 748 96.3 | 575 97.2 | 173 91.9 |             |      |
| Marital status                |                      |                   |                     | 22.22 | < .001|
| Yes                           | 599 68.3 | 424 64.4 | 175 88.1 |             |      |
| No                            | 181 31.7 | 166 35.6 | 15 11.9 |             |      |
| Living                        |                      |                   |                     | 10.85 | .004 |
| Alone                         | 33 5.3 | 32 6.3 | 1 0.4 |             |      |
| With only spouse              | 37 5.5 | 29 5.7 | 8 4.7 |             |      |
| With other family             | 710 89.2 | 529 88.0 | 181 94.9 |             |      |
| Occupation                    |                      |                   |                     | 74.40 | < .001|
| Nonphysical worker            | 444 56.4 | 374 60.5 | 70 35.4 |             |      |
| Physical worker               | 179 24.5 | 154 26.3 | 25 15.0 |             |      |
| Unemployed                    | 157 19.1 | 62 13.2 | 95 49.6 |             |      |
| **Treatment and control of hypertension** | | | | | |
| Systolic \((M\ \text{and SD}\)) | 133.4 0.6 | 133.1 0.7 | 135.1 1.4 | 1.58 | .208 |
| Diastolic \((M\ \text{and SD}\)) | 93.9 0.4 | 94.2 0.3 | 92.4 0.9 | 3.41 | .065 |
| Treatment of hypertension     |                      |                   |                     | 19.01 | < .001|
| Yes                           | 128 13.7 | 81 11.3 | 47 26.2 |             |      |
| No                            | 652 86.3 | 509 88.7 | 143 73.8 |             |      |
| Control of hypertension       |                      |                   |                     | 14.24 | < .001|
| Yes                           | 83 9.2 | 51 7.4 | 32 18.4 |             |      |
| No                            | 697 90.8 | 539 92.6 | 158 81.6 |             |      |
Factors Affecting Hypertension Treatment and Control

Table 5 shows the factors affecting hypertension treatment and control. Hypertension treatment was found to be significantly associated with age, marital status, family history of hypertension, treatment of hyperlipidemia, and waist circumstance in men ($p < .05$) and with age, DM, hyperlipidemia, other chronic diseases, BMI, and high-risk drinking frequency in women ($p < .05$).

In men, hypertension control was found to be significantly associated with age, marital status, family history of hypertension, treatment of hyperlipidemia, aerobic exercise, high sodium intake, and serum cholesterol ($p < .05$). In other words, men who were older and married, had a family history of hypertension, were under treatment for hyperlipidemia, engaged in regular aerobic exercise, consumed a low-salt diet, and had lower serum cholesterol exhibited better hypertension control. Being treated for hyperlipidemia increased hypertension control 11.72 times (95% CI [2.816, 48.784]) over not being treated for hyperlipidemia. Consuming a high-sodium diet decreased hypertension control by 71% (OR = 0.291, 95% CI [0.106, 0.795]) compared with their peers who consumed a lower sodium diet.

In women, hypertension control was found to be significantly associated with age, employment status, DM, hyper-LDL cholesterolemia, high sodium intake, and high-risk drinking frequency ($p < .05$). In other words, women who were older and employed as nonphysical workers, had DM, had lower serum LDL cholesterol, consumed a low-sodium diet and, engaged infrequently in high-risk drinking behaviors exhibited better hypertension control. The OR for hypertension control in the female participants with DM was 6.788 (95% CI [1.969, 23.401]). Furthermore, the presence of hyper-LDL cholesterolemia decreased hypertension control by 83.2% (OR = 0.168, 95% CI [0.031, 0.911]).

Discussion

Although previous studies have reported poor levels of treatment and control of hypertension in young adults compared with older adults (Hales et al., 2017; Moon et al., 2013; Zhang & Moran, 2017), only a few studies have reported on the treatment and control of hypertension in young adults based on gender. Consistent with the findings of earlier studies focused on the general population or older adults (Hales et al., 2017; Park et al., 2012), we found that the rates of treatment and control of hypertension among young adults were lower in men than in women. Many individuals, particularly young adults with hypertension, find it challenging to make appropriate lifestyle changes and to strictly follow the required antihypertensive medication regimens (Merai et al., 2016). However, young adults are more likely to achieve BP control through treatment than their older counterparts (Zhang & Moran, 2017). Therefore, health providers should pay special attention to the treatment and management of hypertension in young adult men.

The factors associated with treatment were found in this study to differ between the two genders. Age was a factor common to treatment and control groups and to both genders. Moreover, age is a well-known risk factor for the total population (Hales et al., 2017; Ikeda et al., 2014). Our findings suggest that the treatment and control of hypertension improve with age, even for young adults. Therefore, it is necessary to establish an effective strategy using the health offices of universities and workplaces to increase the treatment and control of hypertension in adults in their 20s and 30s (Kim, Lee, & Cha, 2017).

The treatment outcomes for hypertension among the young adult subjects in this study were better in married men, but not in married women. After marriage, it is likely that men improve their adherence to medical treatment regimens and BP tracking with family support. Therefore, family education should be given to young men at the time of hypertension diagnosis. Family history of hypertension and treatment of hyperlipidemia, both of which are known risk factors for hypertension (Chang, Park, & Yang, 2013; Van der Niepen & Verbeelen, 2011), also affected the treatment of hypertension in the men in this study. Young adults with a family history of hypertension are usually aware of its risks. However, young men without a family history of hypertension may be less aware and should thus be specifically targeted with related information.

Whereas abdominal obesity was an important factor in young men, BMI was a key factor affecting treatment of hypertension in young women. Previous studies have reported on the effects of BMI on hypertension (Gillespie et al., 2013; Rohla et al., 2016). The findings of this study suggest that abdominal obesity in men may have a stronger association with hypertension. Meanwhile, cardiovascular risk factors such as DM and hyperlipidemia were found to be associated with the treatment of hypertension in women only. A previous study indicated that older women with hypertension had more prevalent cardiovascular risk factors compared with men (Ong et al., 2008). Thus, the management of hypertension and concomitant chronic diseases in women should begin in young adulthood to prevent the onset of cardiovascular diseases in old age.

In the control of hypertension, sodium intake and serum cholesterol status were factors common to both men and women. These findings suggest that maintaining a healthy diet by consuming less sodium and cholesterol should be recommended to both genders to improve hypertension control. The control of hypertension was associated in this study with aerobic exercise in men and alcohol consumption in women. Previous studies have reported an association between physical activity and hypertension control (Cai, Liu, Zhang, Li, & Wang, 2012; Chen, Tsai, & Chou, 2011). The findings in this study regarding an association between alcohol intake and hypertension control in women are consistent with earlier studies that examined all age groups (Chang et al., 2013). A systematic review study found that, although the factors associated with hypertension control vary across studies, a
healthy lifestyle consistently played an important role by increasing treatment compliance, resulting in good control (Chang et al., 2013; Park et al., 2016). The findings of this study suggest that health-related behavioral modifications such as performing aerobic exercise for men and lower alcohol intake for women may help improve hypertension control in young adults. However, smoking, which was identified in previous studies as a factor associated with the control of hypertension (Zhao et al., 2018), was not found to be significant in this study. One possible reason for this may be that the average amount smoked per day did not differ significantly between the groups. A previous Korean report also found that smoking was not a significant factor in the treatment of hypertension for either gender (KCDC, 2008). Therefore, further research using a larger population sample on the association between the treatment and control of hypertension and smoking in young adults is necessary.

Unemployment was identified as a risk factor for hypertension control among the women in this study. In previous studies of older adults, employment status was associated with the treatment and control of hypertension in men only (Chang et al., 2013; Park et al., 2012). It is likely that unemployed women have less access to regular health checkups and medical facilities, making unemployed young women more likely to require hypertension control.

This study may be influenced by several limitations. The cross-sectional design used introduces the risk of causal inference. Moreover, adjusting all confounding variables other than those in the given data set was not possible, as the data used were secondary data from a national database. In addition, the prevalence of hypertension in young adults is low.

### TABLE 2.
**General Characteristics, by Treatment and Control of Hypertension**

| Variable                        | Treatment of Hypertension |          |          |          |          |          |          |
|---------------------------------|---------------------------|----------|----------|----------|----------|----------|----------|
|                                 | Men (n = 590)             | Untreated (n = 509) | Treated (n = 81) |          |          |          |          |
|                                 |                           | n (%)    | n (%)    | p        | n (%)    | n (%)    | p        |
| Age (years; M and SD)           | 34.0                      | 0.4      | 39.8     | 0.5      | < .001   | 37.4     | 0.7      | 41.6     | 0.7      | < .001   |
| 19–29                           | 95                        | 25.5     | 1        | 1.3      | < .001   | 15       | 15.5     | 1        | 4.2      | < .001   |
| 30–39                           | 226                       | 40.9     | 26       | 29.9     |          | 59       | 39.6     | 10       | 13.8     |          |
| 40–44                           | 188                       | 33.6     | 54       | 68.8     |          | 69       | 44.9     | 36       | 82.0     |          |
| Education                       |                           |          | .433     |          | .417     |          |          |          |          |
| Middle school or less           | 12                        | 2.6      | 3        | 4.5      |          | 11       | 7.1      | 6        | 11.2     |          |
| High school or more             | 497                       | 97.4     | 78       | 95.5     |          | 132      | 92.9     | 41       | 88.8     |          |
| Marital status                  |                           |          | < .001   |          | .659     |          |          |          |          |
| Yes                             | 353                       | 61.3     | 71       | 88.8     |          | 131      | 87.3     | 44       | 90.4     |          |
| No                              | 156                       | 38.7     | 10       | 11.2     |          | 12       | 12.7     | 3        | 9.6      |          |
| Living                          |                           |          | .712     |          |          |          |          |          |          |
| Alone                           | 29                        | 6.6      | 3        | 3.7      |          | 1        | 0.6      | 0        | 0.0      |          |
| With only spouse                | 26                        | 5.7      | 3        | 5.9      |          | 6        | 4.7      | 2        | 4.5      |          |
| With other family               | 454                       | 87.7     | 75       | 90.4     |          | 136      | 94.7     | 45       | 95.5     |          |
| Occupation                      |                           |          | .079     |          | .206     |          |          |          |          |
| Nonphysical worker              | 323                       | 60.3     | 51       | 62.2     |          | 53       | 31.5     | 17       | 46.2     |          |
| Physical worker                 | 129                       | 25.5     | 25       | 32.6     |          | 17       | 15.4     | 8        | 14.0     |          |
| Unemployed                      | 57                        | 14.2     | 5        | 5.2      |          | 73       | 53.1     | 22       | 39.7     |          |
| Basic livinghood security recipient |                       |          | .219     |          | .462     |          |          |          |          |
| Yes                             | 20                        | 3.8      | 1        | 1.2      |          | 9        | 6.4      | 4        | 10.2     |          |
| No                              | 489                       | 96.2     | 80       | 98.8     |          | 134      | 93.6     | 43       | 89.8     |          |
| Type of medical security        |                           |          | .507     |          |          |          |          |          |          |
| Health insurance                | 504                       | 99.0     | 81       | 100.0    |          | 141      | 98.6     | 46       | 96.8     |          |
| Medical aid                     | 5                         | 1.0      | 0        | 0.0      |          | 2        | 1.4      | 1        | 3.2      |          |
| Economic status (per month)     |                           |          | .120     |          | .402     |          |          |          |          |
| Low                             | 27                        | 5.5      | 6        | 7.1      |          | 14       | 12.5     | 3        | 8.4      |          |
| Middle-low                      | 121                       | 24.4     | 17       | 21.4     |          | 46       | 33.9     | 18       | 38.8     |          |
| Middle-high                     | 192                       | 38.5     | 23       | 26.9     |          | 43       | 29.4     | 20       | 38.7     |          |
| High                            | 169                       | 31.6     | 35       | 44.6     |          | 40       | 24.2     | 6        | 14.2     |          |
compared with older adults (Zhang & Moran, 2017), with this prevalence 6.5% among adults under 40 years old, 14.6% among adults in their 20s, 0.6% among men in their 30s, and 3.9% among women in their 30s (KCDC, 2008). Finally, the relatively small sample size and potential impacts of other variables on results may impact the overall accuracy and validity of the findings.

**Conclusions**

This study presents the factors affecting the treatment and control of hypertension in young adults in South Korea using a nationally representative sample from the period of 2010 to 2015. The rates of treatment and control of hypertension were found to be fairly low among young adults, suggesting that this population requires special engagement and access to healthcare. Young adult men with hypertension in particular should be closely monitored to improve hypertension treatment and control.

The findings indicate that factors affecting the treatment and control of hypertension differ by gender. Therefore, the guidelines for the treatment and management of hypertension among young adults should be gender specific. In young adult men with hypertension, health providers should consider marital status, family history of hypertension, treatment of hyperlipidemia, and abdominal obesity as risk factors. For young adult women with hypertension, obesity, management of BMI, and regular clinic visits for the management of chronic diseases should be emphasized. Furthermore, healthcare providers should actively suggest behavioral modifications such as reducing sodium intake, performing aerobic exercise, and reducing drinking for young adult men and

|                  | Control of Hypertension |          |          |          |          |          |          |
|------------------|-------------------------|----------|----------|----------|----------|----------|----------|
|                  | Men (n = 590)           | Women (n = 190) | Uncontrolled (n = 539) | Controlled (n = 51) | Uncontrolled (n = 158) | Controlled (n = 32) | p       |
|                  | n                  | %        | n                  | %        | n                  | %        | n                  | %        | n                  | %        | p       |
| 35.1             | 0.4                | 39.6     | 0.6                |           | 37.6             | 0.6      | 42.7             | 0.4      | <.001               |          |
| 96               | 24.6               | 0        | 0.0                |           | 16               | 15.4     | 0                | 0.0      | —                   |          |
| 231              | 39.7               | 21       | 38.8               |           | 64               | 38.3     | 5                | 8.8      | —                   |          |
| 212              | 35.7               | 30       | 61.2               |           | 78               | 46.3     | 27               | 91.2     | .133                 | .442     |
| 12               | 2.5                | 3        | 7.0                |           | 12               | 7.4      | 5                | 11.6     | —                   | .096     |
| 527              | 97.5               | 48       | 93.0               |           | 146              | 92.6     | 27               | 88.4     | —                   | .611     |
| 379              | 62.2               | 45       | 92.4               |           | 144              | 86.2     | 31               | 96.7     | <.001                | .313     |
| 160              | 37.8               | 6        | 7.6                |           | 14               | 13.8     | 1                | 3.3      | —                   | .038     |
| 341              | 60.1               | 33       | 65.2               |           | 57               | 31.2     | 13               | 53.9     | —                   | .654     |
| 139              | 26.1               | 15       | 29.0               |           | 20               | 15.7     | 5                | 11.7     | —                   | .289     |
| 59               | 13.8               | 3        | 5.8                |           | 81               | 53.1     | 14               | 34.4     | —                   | .706     |
| 20               | 3.7                | 1        | 1.8                |           | 10               | 6.9      | —                |          | —                   |          |
| 519              | 96.3               | 50       | 98.2               |           | 148              | 93.1     | —                |          | —                   |          |
| 534              | 99.1               | 51       | 100.0              |           | 156              | 98.7     | 31               | 95.4     | —                   |          |
| 5                | 0.9                | 0        | 0.0                |           | 2                | 1.3      | 1                | 4.6      | —                   |          |
| 28               | 5.3                | 5        | 10.1               |           | 14               | 11.3     | 3                | 11.9     | .117                 |          |
| 129              | 24.4               | 9        | 19.0               |           | 54               | 36.7     | 10               | 28.4     | —                   |          |
| 200              | 38.2               | 15       | 25.5               |           | 49               | 29.9     | 14               | 40.4     | —                   |          |
| 182              | 32.1               | 22       | 45.4               |           | 41               | 22.1     | 5                | 19.3     | —                   |          |


### TABLE 3.

**Physical Health-Related Characteristics and Health Behavior, by Treatment and Control of Hypertension**

| Variable                                           | Treatment of Hypertension |       |       |       |       |       |       |       |       |       |
|---------------------------------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                   |                          | Men   |       | Women |       |       |       |       |       |       |
|                                                   |                           | Untreated | Treated |        | Untreated | Treated |        |        |        |        |
|                                                   |                           | n     | %     | n     | %     | p      | n     | %     | n     | %     | p      |
| Physical health-related characteristics           |                           |       |       |       |       |       |       |       |       |       |
| Perceived health status (M and SD)                | 2.78                      | 0.03  | 2.93  | 0.08  |       | .064  | 2.89  | 0.07  | 3.18  | 0.12  | .035  |
| Awareness of stress                               |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 158                       | 32.2  | 32    | 36.8  |       | .447  | 51    | 36.3  | 13    | 29.7  |        |
| No                                                | 351                       | 67.8  | 49    | 63.2  |       | .417  | 92    | 63.7  | 34    | 70.3  |        |
| Family history of hypertension                    |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 250                       | 47.8  | 63    | 79.1  | <.001 |        | 75    | 52.7  | 30    | 69.7  | .071  |
| No                                                | 259                       | 52.2  | 18    | 20.9  | <.001 |        | 68    | 47.3  | 17    | 30.3  |        |
| Diabetes mellitus                                 |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 25                         | 4.6   | 7     | 8.5   |       | .168  | 7     | 4.4   | 11    | 25.3  | <.001 |
| No                                                | 484                        | 95.4  | 74    | 91.5  |       |       | 136   | 95.6  | 36    | 74.7  |        |
| Treatment of diabetes mellitus                    |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 7                          | 1.2   | 5     | 4.8   |       | .019  | 0     | 0     | 8     | 20.5  |        |
| No                                                | 502                        | 98.8  | 76    | 95.2  |       |       | 143   | 100.0 | 39    | 79.5  |        |
| Hyperlipidemia                                     |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 12                         | 1.9   | 16    | 19.1  | <.001 |        | 2     | 0.9   | 10    | 19.2  |        |
| No                                                | 497                        | 98.1  | 65    | 80.9  | <.001 |        | 141   | 99.1  | 37    | 80.8  |        |
| Treatment of hyperlipidemia                       |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 4                          | 0.8   | 12    | 14.4  | <.001 |        | 0     | 0.0   | 7     | 14.9  |        |
| No                                                | 505                        | 99.2  | 69    | 85.6  | <.001 |        | 143   | 100.0 | 40    | 85.1  |        |
| Other chronic disease                             |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 1                          | 0.1   | 2     | 2.4   | <.001 |        | 3     | 2.0   | 5     | 11.1  | .023  |
| No                                                | 508                        | 99.9  | 79    | 97.6  |       |       | 143   | 98.0  | 42    | 88.9  |        |
| Health behavior                                    |                           |       |       |       |       |       |       |       |       |       |       |
| Drinking amount                                   |                           |       |       |       |       |       |       |       |       |       |       |
| ≤ 1–2 cups                                        | 65                         | 12.4  | 8     | 8.9   |       | .391  | 79    | 50.7  | 31    | 66.0  | .128  |
| ≥ 3–4 cups                                        | 444                        | 87.6  | 73    | 91.1  |       |       | 64    | 49.3  | 16    | 34.0  |        |
| High-risk drinking frequency                      |                           |       |       |       |       |       |       |       |       |       |       |
| < 1 week                                          | 253                        | 50.6  | 40    | 40.2  |       | .098  | 114   | 76.0  | 43    | 93.8  | .005  |
| ≥ 1 week                                          | 256                        | 49.4  | 41    | 59.8  |       |       | 29    | 24.0  | 4     | 6.2   |        |
| Current smoker                                    |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 253                        | 51.6  | 36    | 51.4  |       | .979  | 9     | 6.8   | 4     | 10.4  | .485  |
| No                                                | 256                        | 48.4  | 45    | 48.6  |       |       | 134   | 93.2  | 43    | 89.6  |        |
| Smoking amount (sticks, M and SD)                 | 8.26                       | 0.49  | 8.44  | 1.34  |       | .901  | 0.37  | 0.15  | 0.93  | 0.49  | <.001 |
| Aerobic exercise                                  |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 139                        | 27.2  | 23    | 31.9  |       | .432  | 22    | 18.0  | 10    | 22.8  | .540  |
| No                                                | 370                        | 72.8  | 58    | 68.1  |       |       | 121   | 82.0  | 37    | 77.2  |        |
| Walking activity                                  |                           |       |       |       |       |       |       |       |       |       |       |
| Yes                                               | 210                        | 42.0  | 24    | 32.5  |       | .158  | 51    | 35.4  | 12    | 27.8  | .745  |
| No                                                | 299                        | 58.0  | 57    | 67.5  |       |       | 92    | 64.6  | 35    | 72.2  |        |
### Control of Hypertension

|          | Men \( (n = 590) \) | Women \( (n = 190) \) |          | Men \( (n = 539) \) | Women \( (n = 51) \) |          | Men \( (n = 158) \) | Women \( (n = 32) \) |
|----------|----------------------|-----------------------|----------|----------------------|----------------------|----------|----------------------|----------------------|
|          | \( n \) | %     | \( n \) | %     | \( p \) | \( n \) | %     | \( n \) | %     | \( p \) | \( n \) | %     | \( n \) | %     | \( p \) |
| Uncontrolled | 2.79 | 0.03  | 2.82 | 0.09  | .814 | 2.94 | 0.06  | 3.08 | 0.15  | .396 | 0.72  | .072  | .455  | .001  |
|          | 171  | 32.5  | 19   | 35.4  | .703 | 57   | 37.4  | 7    | 22.4  | .455 | .001  |          |        |        |
|          | 368  | 67.5  | 32   | 64.6  | < .001 | 101  | 62.6  | 25   | 77.6  | .072 | .455  |          |        |        |
|          | 273  | 48.8  | 40   | 82.6  | .194 | 86   | 55.6  | 19   | 63.9  | .001 | .001  |          |        |        |
|          | 266  | 51.2  | 11   | 17.4  |        | 72   | 44.4  | 13   | 36.1  | .001 | .001  |          |        |        |
|          | 28   | 4.7   | 4    | 9.3   | .194 | 9    | 5.6   | 9    | 28.8  | .001 | .001  |          |        |        |
|          | 511  | 95.3  | 47   | 90.7  | .228 | 149  | 94.4  | 23   | 71.2  | .001 | .001  |          |        |        |
|          | 10   | 1.5   | 2    | 3.7   | < .001 | 1    | 1.1   | 7    | 24.1  | .001 | .001  |          |        |        |
|          | 529  | 98.5  | 49   | 96.3  | < .001 | 157  | 98.9  | 25   | 75.9  | .001 | .001  |          |        |        |
|          | 18   | 2.8   | 10   | 17.7  | < .001 | 9    | 5.0   | 3    | 8.5   | .001 | .001  |          |        |        |
|          | 521  | 97.2  | 41   | 82.3  | < .001 | 149  | 95.0  | 29   | 91.5  | .001 | .001  |          |        |        |
|          | 8    | 1.3   | 8    | 14.7  | < .001 | 153  | 96.8  | 30   | 92.9  | .001 | .001  |          |        |        |
|          | 531  | 98.7  | 43   | 85.3  | < .001 | 152  | 96.3  | 30   | 92.8  | .001 | .001  |          |        |        |
|          | 1    | 0.1   | 2    | 3.6   | < .001 | 4    | 3.7   | 2    | 7.2   | .001 | .001  |          |        |        |
|          | 538  | 99.9  | 49   | 96.4  | < .001 | 152  | 96.3  | 30   | 92.8  | .001 | .001  |          |        |        |
|          | 68   | 12.3  | 5    | 8.4   | .448 | 88   | 51.3  | 22   | 69.9  | .122 | .001  |          |        |        |
|          | 471  | 87.7  | 46   | 91.6  | .131 | 70   | 48.7  | 10   | 30.1  | < .001 |        |          |        |        |
|          | 268  | 50.2  | 25   | 38.7  | .131 | 127  | 77.1  | 30   | 96.6  | < .001 |        |          |        |        |
|          | 271  | 49.8  | 26   | 61.3  | .482 | 31   | 22.9  | 2    | 3.4   | .140 | .001  |          |        |        |
|          | 270  | 52.0  | 19   | 46.3  | .482 | 12   | 9.0   | 1    | 2.3   | .140 | .001  |          |        |        |
|          | 269  | 48.0  | 32   | 53.7  | .482 | 146  | 91.0  | 31   | 97.7  | .091 | .851  |          |        |        |
|          | 8.40 | 0.48  | 6.76 | 1.45  | .008 | 0.60 | 0.21  | 0.16 | 0.16  | .034 | .347  |          |        |        |
|          | 141  | 26.3  | 21   | 45.2  | .778 | 25   | 19.0  | 7    | 20.6  | .034 | .347  |          |        |        |
|          | 398  | 73.7  | 30   | 54.8  | .778 | 133  | 81.0  | 25   | 79.4  | .019 | .831  |          |        |        |
|          | 216  | 41.1  | 18   | 38.8  | .778 | 55   | 35.1  | 8    | 25.9  | .034 | .347  |          |        |        |
|          | 323  | 58.9  | 33   | 61.2  | .778 | 103  | 64.9  | 24   | 74.1  | .034 | .347  |          |        |        |
TABLE 4.

*Obesity, Lipid Profile, and Nutritional Intake Status, by Treatment and Control of Hypertension*

| Variable                                      | Treatment of Hypertension                  |                             |                             |                             |
|                                               | Men (n = 590)                             | Untreated (n = 509)         | Treated (n = 81)             | Women (n = 190)             | Untreated (n = 143)          | Treated (n = 47)             |
| BMI (M and SD)                                | 26.4 ± 0.2                                | 27.5 ± 0.5                 | .058                        | 25.3 ± 0.5                  | 26.9 ± 0.5                  | .042                        |
| < 25                                          | 187 (36.6%)                               | 22 (27.1%)                 | .120                        | 79 (54.9%)                  | 12 (26.0%)                  | .001                        |
| ≥ 25                                          | 322 (63.4%)                               | 59 (72.9%)                 |                            | 64 (45.1%)                  | 35 (74.0%)                  |                            |
| Abdominal obesitya (cm; M and SD)             | 88.8 ± 0.49                               | 92.5 ± 1.25                | .006                        | 80.9 ± 1.07                 | 84.9 ± 1.29                 | .026                        |
| Yes                                           | 206 (40.9%)                               | 43 (56.0%)                 | .020                        | 74 (53.9%)                  | 37 (68.4%)                  | .113                        |
| No                                            | 303 (59.1%)                               | 38 (44.0%)                 |                            | 69 (46.1%)                  | 10 (31.6%)                  |                            |
| Hypercholesterolemia                          |                                            |                            |                             | 14 (11.5%)                  | 8 (15.7%)                   | .494                        |
| Yes                                           | 62 (11.2%)                                | 17 (21.0%)                 | .120                        | 14 (10.6%)                  | 2 (1.4%)                    | .020                        |
| No                                            | 447 (88.8%)                               | 64 (79.0%)                 |                            | 129 (88.5%)                 | 39 (84.3%)                  |                            |
| Serum cholesterol (M and SD)                  | 197.9 ± 2.0                               | 187.0 ± 3.6                | .006                        | 194.2 ± 3.5                 | 184.3 ± 5.2                 | .147                        |
| Hypertriglyceridemia                          |                                            |                            |                             | .588                        |                             | .822                        |
| Yes                                           | 189 (36.9%)                               | 27 (38.9%)                 |                             | 19 (16.3%)                  | 7 (15.0%)                   |                             |
| No                                            | 320 (63.1%)                               | 54 (61.1%)                 |                             | 124 (83.7%)                 | 45 (85.0%)                  |                             |
| Hyper-LDL cholesterolemia                     |                                            |                            |                             | .016                        |                             | < .001                      |
| Yes                                           | 49 (9.6%)                                 | 4 (2.7%)                   | .259                        | 14 (10.6%)                  | 2 (1.4%)                    |                             |
| No                                            | 460 (90.4%)                               | 77 (97.3%)                 |                             | 129 (89.4%)                 | 45 (98.6%)                  |                             |
| Low-HDL cholesterolemia                       |                                            |                            |                             | .011                        |                             | .106                        |
| Yes                                           | 136 (25.9%)                               | 33 (41.1%)                 | .215                        | 23 (17.1%)                  | 12 (30.4%)                  |                             |
| No                                            | 373 (74.1%)                               | 48 (58.9%)                 |                             | 120 (82.9%)                 | 35 (69.6%)                  |                             |
| Serum glucose (M and SD)                      | 98.3 ± 0.9                                | 99.9 ± 1.7                 | .399                        | 94.4 ± 1.1                  | 101.8 ± 3.1                 | .160                        |
| Daily nutritional intake status               |                                            |                            |                             |                             |                             |                             |
| Protein (g; M and SD)                         | 99.4 ± 2.4                                | 98.6 ± 6.3                 | .901                        | 62.9 ± 3.3                  | 62.4 ± 5.3                  | .940                        |
| Fat (g; M and SD)                             | 66.4 ± 2.4                                | 57.2 ± 4.8                 | .082                        | 42.6 ± 3.2                  | 38.1 ± 4.1                  | .414                        |
| Carbohydrate (g; M and SD)                    | 364.3 ± 5.9                               | 383.9 ± 16.3               | .265                        | 269.7 ± 12.4                | 300.5 ± 24.2                | .274                        |
| Fiber (g; M and SD)                           | 14.6 ± 0.5                                | 15.5 ± 1.4                 | .546                        | 10.8 ± 0.7                  | 14.3 ± 1.8                  | .127                        |
| High sodium intake                            |                                            |                            |                             | .298                        |                             | .247                        |
| Yes                                           | 479 (94.9%)                               | 75 (91.5%)                 | .901                        | 104 (71.4%)                 | 36 (61.4%)                  |                             |
| No                                            | 30 (5.1%)                                 | 6 (8.5%)                   |                             | 39 (28.6%)                  | 11 (38.6%)                  |                             |
| Low potassium intake                          |                                            |                            |                             | .302                        |                             | .929                        |
| Yes                                           | 259 (53.8%)                               | 39 (47.1%)                 |                             | 114 (79.5%)                 | 33 (78.9%)                  |                             |
| No                                            | 250 (46.1%)                               | 42 (52.9%)                 |                             | 29 (20.5%)                  | 14 (21.1%)                  |                             |
| Low calcium intake                            |                                            |                            |                             | .803                        |                             | .745                        |
| Yes                                           | 378 (76.2%)                               | 60 (77.6%)                 |                             | 124 (86.6%)                 | 39 (84.7%)                  |                             |
| No                                            | 131 (23.8%)                               | 21 (22.4%)                 |                             | 19 (13.4%)                  | 8 (15.3%)                   |                             |

*awaist circumference.*
### Control of Hypertension

|                | Men (n = 590) |               | Women (n = 190) |               |
|----------------|---------------|---------------|-----------------|---------------|
|                | Uncontrolled  | Controlled    | Uncontrolled    | Controlled    |
|                | (n = 539)     | (n = 51)      | (n = 158)       | (n = 32)      |
| n              | %             | n             | %              | n             | %             |
| 26.5           | 0.2           | 27.4          | 0.7            | 25.6          | 0.4           | 26.3          | 0.6            |
| 193            | 36.0          | 16            | 29.0           | 81            | 50.1          | 10            | 34.9           |
| 346            | 64.0          | 35            | 71.0           | 77            | 49.9          | 22            | 65.1           |
| 88.9           | 0.47          | 92.9          | 1.67           | 81.6          | 0.97          | 83.9          | 1.74           |
| 224            | 41.7          | 25            | 53.7           | 88            | 58.0          | 23            | 56.2           |
| 315            | 58.3          | 26            | 46.3           | 70            | 42.0          | 9             | 43.8           |
| 69             | 12.0          | 10            | 16.6           | 19            | 13.6          | 3             | 8.3            |
| 470            | 88.0          | 41            | 83.4           | 139           | 86.4          | 29            | 91.7           |
| 197.9          | 1.9           | 181.8         | 3.7            | < .001        | 193.4         | 3.3           | 183.5          | 5.7            |
| 202            | 37.5          | 14            | 32.7           | 23            | 16.7          | 3             | 12.6           |
| 337            | 62.5          | 37            | 67.3           | 135           | 83.3          | 29            | 87.4           |
| 49             | 9.2           | 4             | 4.1            | 14            | 9.6           | 2             | 2.0            |
| 490            | 90.8          | 47            | 95.9           | 144           | 90.4          | 30            | 98.0           |
| 148            | 26.5          | 21            | 42.4           | 28            | 19.0          | 7             | 27.7           |
| 391            | 73.5          | 30            | 57.6           | 130           | 81.0          | 25            | 72.3           |
| 98.2           | 0.8           | 101.0         | 2.2            | 94.9          | 1.1           | 102.7         | 3.9            |
| 99.4           | 2.3           | 97.8          | 7.5            | 63.6          | 3.2           | 59.3          | 5.2            |
| 65.8           | 2.3           | 59.9          | 6.2            | 42.3          | 3.0           | 37.5          | 5.4            |
| 365.5          | 5.7           | 379.4         | 22.7           | 277.9         | 12.3          | 276.9         | 25.1           |
| 14.6           | 0.5           | 15.3          | 1.8            | 11.0          | 0.7           | 15.1          | 2.3            |
| 509            | 95.1          | 45            | 86.9           | 117           | 72.8          | 23            | 50.7           |
| 30             | 4.9           | 6             | 13.1           | 41            | 27.2          | 9             | 49.3           |
| 279            | 53.2          | 28            | 52.1           | 124           | 78.6          | 23            | 82.3           |
| 269            | 46.8          | 23            | 47.9           | 34            | 21.4          | 9             | 17.7           |
| 398            | 76.1          | 40            | 80.2           | 136           | 86.4          | 27            | 84.7           |
| 141            | 23.9          | 11            | 19.8           | 22            | 13.6          | 5             | 15.3           |
**TABLE 5.**

*Weighted Multivariate Logistic Regression Analysis of Factors Affecting Hypertension Treatment and Control, by Gender*

| Dependent Variable | Independent Variable                          | Odds Ratio | 95% Confidence Interval | p   |
|--------------------|-----------------------------------------------|------------|-------------------------|-----|
| Treatment of hypertension Men | Age (per 1 year) | 1.139 | [1.065, 1.218] | < .001 |
|                     | Marital status (reference: no) Yes | 2.930 | [1.107, 7.757] | .030  |
|                     | Family history of hypertension (reference: no) Yes | 3.764 | [1.943, 7.290] | < .001 |
|                     | Treatment of hyperlipidemia (reference: no) Yes | 13.804 | [2.935, 64.914] | < .001 |
|                     | Waist circumstance (per 1 cm) | 1.032 | [1.005, 1.061] | .022  |
| Treatment of hypertension Women | Age (per 1 year) | 1.236 | [1.009, 1.516] | .041  |
|                      | Diabetes mellitus (reference: no) Yes | 4.657 | [1.489, 15.567] | .008  |
|                      | Hyperlipidemia (reference: no) Yes | 24.178 | [3.304, 176.922] | .001  |
|                      | Other chronic disease (reference: no) Yes | 11.670 | [2.449, 55.601] | .002  |
|                      | BMI (reference: < 25) ≥ 25 | 3.432 | [1.331, 8.848] | .010  |
|                      | High-risk drinking frequency (reference: < 1 week) ≥ 1 week | 0.128 | [0.031, 0.520] | .004  |
| Control of hypertension Men | Age (per 1 year) | 1.090 | [1.011, 1.175] | .024  |
|                      | Marital status (reference: no) Yes | 5.774 | [1.827, 18.250] | .002  |
|                      | Family history of hypertension (reference: no) Yes | 4.013 | [1.782, 9.038] | < .001 |
|                      | Treatment of hyperlipidemia (reference: no) Yes | 11.720 | [2.816, 48.784] | < .001 |
|                      | Aerobic exercise (reference: no) Yes | 2.734 | [1.398, 5.346] | .003  |
|                      | High sodium intake (reference: no) Yes | 0.291 | [0.106, 0.795] | .016  |
|                      | Serum cholesterol (per 1 mg/dl) | 0.984 | [0.975, 0.994] | .001  |
| Control of hypertension Women | Age (per 1 year) | 1.405 | [1.113, 1.775] | .004  |
|                      | Job (reference: nonphysical worker) Physical worker | 0.420 | [0.116, 1.526] | .188  |
|                      | Unemployed | 0.340 | [0.156, 0.745] | .007  |
|                      | Diabetes mellitus (reference: no) Yes | 6.788 | [1.969, 23.401] | .002  |
|                      | Hyper-LDL cholesterolemia (reference: no) Yes | 0.168 | [0.031, 0.911] | .038  |
|                      | High sodium intake (reference: no) Yes | 0.364 | [0.162, 0.817] | .014  |
|                      | High-risk drinking frequency (reference: < 1 week) ≥ 1 week | 0.181 | [0.040, 0.821] | .026  |
women. Although this study identified several gender-specific factors that affect the treatment and control of hypertension in early adulthood, future studies should evaluate other factors such as psychometrics that may be associated with hypertension in young adults. Moreover, interventions for the control of hypertension should actively target young adults.

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Study conception and design: JSK, CGK
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The authors declare no conflicts of interest.

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