Factors Associated With Blood Pressure Classification in Korean University Students: A Descriptive Survey

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ABSTRACT

Background: The prevalence of hypertension in young adults has increased. Hypertension is known to be a leading contributor to many diseases.

Purpose: The study aimed to identify factors influencing blood pressure (BP) classification in university students and to establish a basis for the prevention and management of hypertension in young adults.

Methods: Four hundred three university students in South Korea were analyzed to determine the factors that influence BP classification. Data were analyzed using the chi-square test, analysis of variance, and multinomial logistic regression.

Results: The reference group for the logistic regression analysis included students with normal BP. The odds of being male and of having an overweight or obese body mass index were significantly higher in the prehypertension group than in the normal BP group. The odds of regular (≥6 months) exercise habits, having subcutaneous and borderline visceral fat types, and social support were significantly lower in the prehypertension group than in the normal BP group. The odds of being male, being overweight or obese, and having more exercise barriers were significantly higher in the hypertension group than in the normal BP group. The odds of having a high or low economic status were higher and lower in the hypertension group, respectively. Finally, the odds of having subcutaneous or borderline visceral fat types and a vigorous physical activity level were significantly lower in the hypertension group than in the normal BP group.

Conclusions: Interventions that address the factors related to BP in young adults are necessary to prevent the occurrence and progression of hypertension in young adults.

Key Words: blood pressure, university student.

Introduction

Blood pressure (BP), which may be categorized as normal, prehypertensive, and hypertensive, may increase because of a diverse set of factors, which include age, gender, weight, and diet. The global prevalence of prehypertension is 25%–50%, and the risk of progression to hypertension within 5 years is high. Particularly, 22%–50% of patients with prehypertension develop hypertension (Egan & Stevens-Fabry, 2015). The prevalence rates of hypertension in adults aged 30–39 years in South Korea are 16.9% and 3.3% in men and women, respectively (Korea Centers for Disease Control & Prevention, 2017). However, the prevalence rate of hypertension in adults aged 18–29 years has not been reported in South Korea. In the United States, the prevalence rate of hypertension in adults aged 18–40 years is 7.3%, with the prevalence higher among men than women and the prevalence increasing rapidly (over four-fold) after the age 40 years (Yoon, Carroll, & Fryar, 2015). Compared with middle-aged and elderly individuals, young adults have a low level of knowledge and awareness regarding the treatment and management of hypertension, which increases their risk of cardiovascular disease and stroke (Benjamin et al., 2017; De Venecia, Lu, & Figueredo, 2016).

Prehypertension and hypertension may be major factors contributing to cardiovascular death in adults (Egan & Stevens-Fabry, 2015; Viera & Hawes, 2016). Hypertension is associated with an increased likelihood of obesity in adults, changes in lifestyle, increased uric acid levels, higher concentrations of triglycerides in the blood, and higher resting heart rate (Ashman, Rui, & Schappert, 2016; Cheng, Medlow, & Steinbeck, 2016; De Venecia et al., 2016). Because of the rising prevalence of hypertension and prehypertension in young adults, research is needed on the prevention and management of this issue in this group (Cheng et al., 2016; Egan & Stevens-Fabry, 2015; Korea Centers for Disease Control & Prevention, 2017; Zhang & Moran, 2017). However, most studies on hypertension have been conducted on the older adults or on adults older than 40 years. Comparatively little research has been done on this issue in young adults.

Compared with middle-aged and elderly individuals, fewer young, hypertensive patients (aged 18–44 years) engage in the
treatment or management of hypertension, and they tend to have lower hypertension awareness (Ashman et al., 2016; Wang et al., 2014; Yoon et al., 2015). Young adults must cope with obesity, psychological stresses in adapting to college life, anxiety, and depression (Bruno et al., 2016; De Venecia et al., 2016). As they become independent of parental influence at the age of 19 years or older, they may face difficulties in managing their lifestyle habits, leading to increased drinking, smoking, and inappropriate eating behaviors that negatively influence cardiovascular health and ultimately increase the prevalence of hypertension (Benjamin et al., 2017; Lee et al., 2014). Hence, the prevalence of hypertension, as well as associated secondary complications and concomitant diseases, has been shown to rapidly increase among middle-aged and elderly individuals (Ashman et al., 2016; De Venecia et al., 2016; Yoon et al., 2015).

The primary intervention that is currently used to manage BP is the correction of lifestyle habits through increased physical activity and dietary control (Gabb et al., 2016). However, young adults differ in terms of physical condition, physical activities, diet, drinking habits, and various physiological factors from their elderly and middle-aged adult peers (Mucci et al., 2016). People are most physically active during young adulthood, and physical activity decreases after 30 years old, resulting in reduced muscle mass and increased body fat. Hence, the prevalence of hypertension is higher among individuals who are 30 years and older (Korea Centers for Disease Control & Prevention, 2017; Shin & Ok, 2012).

Therefore, identifying hypertension risk factors according to BP classifications is necessary to prevent the onset and progression of hypertension in university students. This descriptive survey study was conducted to identify the related risk factors by BP classification in university students and to establish a basis for preventing and managing hypertension in young adults.

**Methods**

**Participants**

The participants in this study were university students aged 20–35 years (classified as young adults) who understood the study objectives, volunteered to participate, and were able to complete a self-report survey. We obtained institutional review board approval (IRB: CBNU-2015-0088) and informed consent from all of the participants before data collection. The participants (N = 420) were recruited via convenience sampling from three universities in three cities in South Korea (Seoul, Daejeon, and Cheongju). Young adults were recruited through posters placed in university lecture rooms and on bulletin boards. The minimum sample size was estimated using G*Power 3.1 (Kiel University, Kiel, Germany) based on a medium effect size (0.15), a significance level of .05, and a statistical power of 0.80. The estimated minimum sample size was 376. Four hundred twenty surveys were returned between September and October 2016, of which 17 were excluded because of incomplete responses, leaving 403 for inclusion in the final analysis.

**Demographic Characteristics**

The participants were classified into normal BP, prehypertensive, and hypertensive groups by measuring BP once after a 5-minute rest period. Sociodemographic characteristics, including age, gender, economic status, stress level, subjective health status, smoking status, drinking status, sleep duration (hours), visceral fat level, and body mass index (BMI), were examined. Subjective health status was measured on a 5-point scale. Stress level was measured using the Korean version of the Brief Encounter Psychosocial Instrument (Hur et al., 1996). The Cronbach’s α of the Korean version of the Brief Encounter Psychosocial Instrument was .80 at the time of its development and .816 in this study. BMI was classified as underweight (< 18.5 kg/m²), healthy weight (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²), or obese (≥ 30 kg/m² or more; WHO Expert Consultation, 2004). Visceral fat, measured using a body composition analyzer (Inbody 720; Biospace Co., Seoul, South Korea) that employed bioelectric impedance analysis, was classified into several types, including subcutaneous, balanced, borderline, visceral obese, and excessively visceral obese.

**Physical Activity**

Physical activity characteristics included physical activity level, exercise habits, self-efficacy in exercise, social support for physical activity, exercise-related decision making (exercise benefits and factors that impede exercise), and physical activity planning adjustment. Physical activity level was measured using the International Physical Activity Questionnaire and classified as light, moderate, or vigorous based on scoring and classification systems (IPAQ Research Committee, 2005). Exercise habits were examined using the Stage of Readiness to Exercise Questionnaire. Those participants who exercised were categorized into three groups according to whether they exercised regularly for ≥ 6 months or for < 6 months, and all others were categorized into the irregular exercise group (Marcus, Selby, Niaura, & Rossi, 1992). Self-efficacy in exercise was measured using the Exercise Self-Efficacy scale, which consists of five items that are scored on a 5-point scale, with higher total scores associated with higher self-efficacy (Marcus et al., 1992). The Cronbach’s α was .82 at the time the instrument was developed and .855 in this study. Social support for physical activity was measured using a tool modified to suit Korean culture. The instrument is composed of seven items rated on a 5-point scale, with higher total scores indicating a higher level of social support for exercise (Choi, 2008). The Cronbach’s α was .89 at the time the instrument was developed and .906 in this study. Exercise-related decision making was measured using the Decisional Balance Scale for Exercise, which consists of five items addressing factors that promote exercise and five items addressing factors that impede exercise (Nigg, Rossi, Norman, & Benisovich, 1998). At the time of instrument development, the Cronbach’s α was .87 for exercise-promoting factors and .90 for exercise-impeding factors, and these values were .872 and .750 in this study, respectively. The extent to which participants managed...
their physical activity scheduling and planning was measured using the Exercise Planning Scale. This instrument consists of 10 items that are scored on a 5-point scale, with higher total scores indicating a higher level of physical activity planning adjustment (Rovniak, Anderson, Winett, & Stephens, 2002). The Cronbach’s α was .87 at the time of instrument development and .760 in this study.

**Statistical Analysis**

Data were analyzed using SPSS Statistics 23.0 (IBM, Armonk, NY, USA). First, frequencies, percentages, means, and standard deviations were computed for the sociodemographic and physical activity characteristics of the participants according to their BP classification. Chi-square tests and analysis of variance were then performed to test homogeneity across these three groups. Second, multinomial logistic regression was performed to compute the odds ratios (ORs) and 95% confidence intervals for the BP classification of the participants, with the normal BP group used as the reference.

**Results**

Of the 403 subjects, 218 (54.1%) were categorized into the normal BP group, 147 (36.5%) were categorized into the prehypertensive group, and 38 (9.4%) were categorized into the hypertensive group (Table 1). Age, gender, economic status, smoking status, visceral fat level, and BMI classification differed significantly across the groups. Age was significantly higher in the prehypertensive and hypertensive groups than in the normal BP group ($F = 8.58, p < .001$). The proportion of men was significantly lower in the normal BP group than in the prehypertensive and hypertensive groups ($\chi^2 = 62.56, p < .001$). Moreover, economic status was significantly different across BP classification ($\chi^2 = 10.40, p = .034$). The prevalence of smoking was significantly higher in the hypertensive and prehypertensive groups than in the normal BP group, differing significantly across BP classification ($\chi^2 = 15.97, p < .001$). The rates of the borderline and visceral obese types of visceral fat level were significantly higher in the prehypertensive and hypertensive groups than in the normal BP group ($\chi^2 = 52.55, p < .001$). In terms of BMI, the percentage of people with a healthy weight was significantly higher in the normal BP group than in the prehypertensive and hypertensive groups ($\chi^2 = 51.81, p < .001$). Furthermore, stress, subjective health status, drinking status, and sleep duration did not differ significantly across BP classification.

In terms of physical activity characteristics, only those factors that impede exercise differed significantly across BP classification, with related scores higher in the normal BP group than in the prehypertensive group ($F = 3.65, p = .027$). Apart from factors that impede exercise, all other variables, including physical activity level, exercise habits, self-efficacy in exercise, social support for physical activity, beneficial exercise factors, and physical activity planning adjustment, showed no significant difference across BP classification.

The results of the logistic regression analysis, conducted using the normal BP group as the reference and used to identify the factors that influence the BP classification of the participants, are presented separately for the prehypertensive and hypertensive groups in Table 2. The prehypertensive group was significantly associated with gender, visceral fat level, and BMI. The odds of being male were significantly higher in the prehypertensive group than in the normal BP group ($OR = 3.34, p < .001$). In terms of visceral fat level, using the balanced type in the prehypertensive group as a reference, the odds of being in the subcutaneous type ($OR = 0.51, p = .031$) and borderline type ($OR = 0.34, p = .017$) category were significantly lower in the prehypertensive group than in the normal BP group. Finally, for BMI, using healthy weight in the prehypertensive group as a reference, the odds of being overweight were significantly higher in the prehypertensive group than in the normal BP group ($OR = 4.80, p = .001$). The odds of social support for physical activity and exercise habits differed significantly between the prehypertensive and normal BP groups. Using irregular exercise in the prehypertensive group as a reference, the odds of performing regular exercise for <6 months and of having social support for physical activity were both significantly lower in the prehypertensive group than in the normal BP group ($OR = 0.41, p = .043$, and $OR = 0.94, p = .029$, respectively). No other physical activity variable was significantly related to prehypertensive BP.

Significant differences in the odds for gender and economic status were found between the hypertensive and normal BP groups. The odds of being male were significantly higher in the hypertensive group than in the normal BP group ($OR = 13.91, p < .001$). Using the middle economic status in the hypertensive group as the reference, the odds of having a high economic status were significantly higher ($OR = 7.95, p = .021$) and the odds of having a low economic status were significantly lower ($OR = 0.21, p = .050$) in the hypertensive group than in the normal BP group. In terms of the physical activity characteristics, the visceral fat level and BMI were significantly related to hypertension. Specifically, the odds of having the subcutaneous visceral fat type (vs. the balanced type) was significantly lower in the hypertensive group than in the normal BP group ($OR = 0.17, p = .042$). Moreover, the odds of being overweight (vs. healthy weight) were significantly greater in the hypertensive group ($OR = 16.03, p = .015$). Exercise habits, physical activity level, and having factors that impeded exercise in exercise-related decision making were all significantly related to hypertension. The odds of having a vigorous (vs. light) level of physical activity were significantly lower in the hypertensive group ($OR = 0.19, p = .040$), whereas the odds of having more factors that impeded exercise were significantly higher in the hypertensive group ($OR = 1.15, p = .035$).

**Discussion**

Overall, 36.5% of the participants were prehypertensive and 9.4% were hypertensive. Although the prevalence of
### TABLE 1.
**Participant Sociodemographic and Physical Activity Characteristics, by Blood Pressure Group (N = 403)**

| Variable                                | Normal (n = 218) | Prehypertension (n = 147) | Hypertension (n = 38) | Total (N = 403) | F/$\chi^2$ | p/Post hoc |
|-----------------------------------------|------------------|---------------------------|-----------------------|-----------------|-----------|-----------|
| Age (years; $M$ and $SD$)               | 20.88 1.96       | 21.65 2.48                | 22.16 2.43            | 21.28 2.25      | 8.58      | < .001    |
| Gender                                  |                  |                           |                       |                 | 62.56     | < .001    |
| Male                                    | 60 27.5          | 87 59.2                   | 32 84.2               | 179 44.4        |           |           |
| Female                                  | 158 72.5         | 60 40.8                   | 6 15.8                | 224 55.6        |           |           |
| Economic status                         |                  |                           |                       |                 | 10.40     | .034      |
| Upper                                   | 32 14.7          | 21 14.3                   | 3 7.9                 | 56 13.9         |           |           |
| Middle                                  | 181 83.0         | 119 81.0                  | 30 78.9               | 330 81.9        |           |           |
| Lower                                   | 5 2.3            | 7 4.8                     | 5 13.2                | 17 4.2          |           |           |
| Stress ($M$ and $SD$)                   | 11.89 3.64       | 11.04 3.62                 | 11.05 4.01            | 11.50 3.69      | 2.69      | .069      |
| Subjective health status ($M$ and $SD$) | 3.27 0.84        | 3.24 1.00                 | 3.16 1.05             | 3.25 0.92       | 0.22      | .799      |
| Drinking                                |                  |                           |                       |                 | 2.54      | .281      |
| Yes                                     | 170 78.0         | 110 74.8                  | 33 86.8               | 313 77.7        |           |           |
| No                                      | 48 22.0          | 37 25.2                   | 5 13.2                | 90 22.3         |           |           |
| Smoking                                 |                  |                           |                       |                 | 15.97     | < .001    |
| Yes                                     | 23 10.6          | 34 23.1                   | 12 31.6               | 69 17.1         |           |           |
| No                                      | 195 89.4         | 113 76.9                  | 26 68.4               | 334 82.9        |           |           |
| Sleep time, hours/day                   |                  |                           |                       |                 | 2.70      | .260      |
| $\geq$ 7–8                              | 103 47.2         | 80 54.4                   | 16 42.1               | 199 49.4        |           |           |
| < 7                                     | 115 52.8         | 67 45.6                   | 22 57.9               | 204 50.6        |           |           |
| Visceral fat type                       |                  |                           |                       |                 | 52.55     | < .001    |
| Subcutaneous                            | 97 44.5          | 28 19.0                   | 5 13.2                | 130 32.3        |           |           |
| Balanced                                | 95 43.6          | 82 55.8                   | 16 42.1               | 193 47.9        |           |           |
| Borderline                              | 24 11.0          | 24 16.3                   | 11 28.9               | 59 14.6         |           |           |
| Visceral obese                          | 2 0.9            | 13 8.8                    | 6 15.8                | 21 5.2          |           |           |
| BMI                                     |                  |                           |                       |                 | 51.81     | < .001    |
| Underweight                             | 16 7.3           | 4 2.7                     | 3 7.9                 | 23 5.7          |           |           |
| Healthy weight                          | 187 85.8         | 96 65.3                   | 19 50.0               | 302 74.9        |           |           |
| $\geq$ Overweight                       | 15 6.9           | 47 32.0                   | 16 42.1               | 78 19.4         |           |           |
| IPAQ                                    |                  |                           |                       |                 | 2.47      | .650      |
| Light                                   | 26 11.9          | 13 8.8                    | 5 13.2                | 44 10.9         |           |           |
| Moderate                                | 101 46.3         | 66 44.9                   | 20 52.6               | 187 46.4        |           |           |
| Vigorous                                | 91 41.7          | 68 46.3                   | 13 34.2               | 172 42.7        |           |           |
| Exercise habits                          |                  |                           |                       |                 | 2.32      | .677      |
| Regular (≥ 6 months)                    | 33 15.1          | 26 17.7                   | 8 21.1                | 67 16.6         |           |           |
| Regular (< 6 months)                    | 18 8.3           | 12 8.2                    | 5 13.2                | 35 8.7          |           |           |
| Irregular                               | 167 76.6         | 109 74.1                  | 22 65.8               | 301 74.7        |           |           |
| $M$ $SD$                                 | 15.27 4.55       | 16.33 4.77                | 16.29 4.63            | 15.75 4.66      | 2.58      | .077      |
| Social support for physical activity    | 24.23 5.33       | 23.58 6.68                | 23.63 5.48            | 23.94 5.86      | 0.61      | .546      |
| Beneficial exercise factors             | 20.21 3.34       | 20.69 3.73                | 20.76 3.27            | 20.44 3.48      | 1.03      | .360      |
| Barrier exercise factors                | 10.97 3.65       | 9.97 3.57                 | 10.08 3.69            | 10.52 3.65      | 0.027     |           |
| Physical activity planning adjustment   | 13.36 2.55       | 13.80 2.60                | 14.03 2.73            | 13.58 2.60      | 1.91      | .149      |

Note. BMI = body mass index; IPAQ = International Physical Activity Questionnaire.
hypertension in this study was similar to that among adults aged 18–44 years in the United States (9%; Ashman et al., 2016), it was less than that among adults aged 18–35 years in Italy (11%; Bruno et al., 2016). Although the mean age of the participants (21 years) in this study was much lower than that in previous studies, the prevalence of hypertension was similar. Moreover, considering the high prevalence of prehypertension, it is likely that hypertension will markedly increase among these Korean adults within 5 years. This study found that BP increased with age, which aligns with the changes in physical condition and the number of concomitant diseases by age group (Bruno et al., 2016; Everett & Zajacova, 2015; Yoon et al., 2015). Moreover, the finding that the percentage of men was lower in the normal BP group than in the prehypertensive and hypertensive groups is consistent with that in previous studies, which showed that BP is higher in men than in women (Lee et al., 2014; Mucci et al., 2016). Although young men have a higher prevalence of hypertension than young women, they have lower levels of management and awareness of hypertension (Everett & Zajacova, 2015).

In the logistic regression analysis, the prehypertensive group showed significant relationships with gender, visceral fat level, and BMI. Compared with the normal BP group, the prehypertensive group had greater odds of being male, which is consistent with a previous study that found being male to be the factor that most strongly influenced the development of hypertension in young adults (Bruno et al., 2016; Mucci et al., 2016). In terms of visceral fat level, the prehypertensive group had lower odds of being in the subcutaneous and borderline categories than being in the balanced category. In terms of BMI, the odds of being overweight were significantly greater in the prehypertensive group than in the normal BP

| Variable                          | Prehypertension | Hypertension |
|-----------------------------------|-----------------|--------------|
| Gender (male)                     | −0.10 (0.06)    | 0.08 (0.10)  |
| Economic status                   |                 |              |
| Upper                             | 0.80 (0.71)     | 2.07 (0.90)  |
| Lower                             | 0.01 (0.037)    | −1.55 (0.79) |
| Stress                            | −0.06 (0.04)    | −0.08 (0.07) |
| Subjective health status          | −0.09 (0.16)    | −0.18 (0.26) |
| Drinking (yes)                    | −0.30 (0.30)    | 1.01 (0.65)  |
| Smoking (yes)                     | 0.40 (0.38)     | 0.33 (0.53)  |
| Sleep time (≥7–8 hours/day)       | −0.37 (0.26)    | 0.38 (0.45)  |
| Visceral fat                      | −0.68 (0.31)    | 1.13 (0.71)  |
| Borderline type                   | −1.07 (0.45)    | −0.40 (0.66) |
| Visceral obese                    | 0.72 (0.93)     | 2.06 (1.14)  |
| BMI                               | −0.24 (0.65)    | 0.13 (0.79)  |
| ≥ Overweight                      | 1.57 (0.48)     | 1.13 (1.15)  |
| IPAQ                              |                 |              |
| Moderate                          | 0.00 (0.42)     | −0.33 (0.69) |
| Vigorous                          | 0.00 (0.46)     | 0.42 (0.24)  |
| Exercise habit                     |                 |              |
| Regular (≥6 months)               | −0.90 (0.44)    | 0.32 (0.73)  |
| Regular (<6 months)               | −0.09 (0.49)    | 0.17 (0.97)  |
| Social support for physical activity | −0.06 (0.03)  | −0.03 (0.05) |
| Self-efficacy in exercise         | 0.06 (0.04)     | 0.07 (0.07)  |
| Beneficial exercise factors       | 0.02 (0.04)     | 0.05 (0.07)  |
| Exercise-impeding factors         | 0.00 (0.04)     | 0.14 (0.70)  |
| Physical activity planning        | 0.03 (0.06)     | 0.24 (0.10)  |

Note. Reference groups are as follows: normal BP: female, economic status: middle, drinking: no, smoking: no, sleep time: ≤7–8 hours/day, visceral fat: balanced type, BMI: healthy weight, IPAQ: light, and exercise habit: irregular. BMI = body mass index; IPAQ = International Physical Activity Questionnaire.
group when healthy weight in the former group was used as the reference. Obesity impairs renal function, increases BP, and increases visceral fat (i.e., fat around the kidneys), which is characteristic of obesity-related hypertension (Hall, do Carmo, da Silva, Wang, & Hall, 2015). However, this study did not find a relationship between BP classification and either drinking or smoking. Rather than drinking and smoking per se, the quantity, frequency, and duration of drinking and smoking likely influence BP elevation (Núñez-Córdoba et al., 2009; Samadian, Dalili, & Jamalian, 2016). In addition, this study found no relationship between BP classification and stress, subjective health status, or sleep duration, likely because obesity and visceral fat are the most important causes of BP elevation (Zhang & Moran, 2017). Moreover, the prehypertension group showed significant associations with exercise habits and social support for physical activity. The odds of regular exercise for <6 months and having social support for physical activity were significantly lower in the prehypertension group. These findings suggest that social support or group interventions aimed at increasing motivation have the potential to change and help maintain exercise habits in young adults, whereas regular physical activity helps maintain normal BP (Molanorouzi, Khoo, & Morris, 2015; Patnode, Evans, Senger, Redmond, & Lin, 2017; Ramchand et al., 2017). Therefore, both social support and motivation should be considered when planning physical activities that are aimed at preventing and managing hypertension.

The hypertensive group showed significant associations with gender and economic status. As previously reported, being male was found to be the factor with the greatest impact on hypertension, with the OR in this study nearly four times that reported in past studies (Bruno et al., 2016; Mucci et al., 2016). This finding may be related to the high rate of binge drinking among Korean adults, especially men in their 20s, which may increase BP (Korea Centers for Disease Control & Prevention, 2017; Wellman et al., 2016; World Health Organization, 2014). Compared with the normal BP group, the hypertensive group faced significantly lower odds of being in the subcutaneous visceral fat category and significantly higher odds of being overweight. These findings are consistent with those of a prior study showing that obesity accounted for >65% of the contribution to the causes of hypertension and that risk of BP is increased by obesity-related renal dysfunction (Rovniak et al., 2002). In terms of exercise-related characteristics, the hypertensive group had lower odds of engaging in vigorous physical activity than the normal BP group and had significantly more exercise-impeding factors. These findings may be related to the mean age of the participants in this study (21 years). At this age, individuals tend to be particularly sensitive about body image, which affects their levels of physical activity and dietary habits (Molanorouzi et al., 2015). Moreover, previous studies found exercise-impeding factors to be more prevalent at younger ages, which in turn may decrease physical activity, increase weight, and, ultimately, increase BP (Bruno et al., 2016; Butt, Weinberg, Breckon, & Claytor, 2011). It is thought that variables other than those mentioned above were not influential in this study because of the smaller number of hypertensive young adults than prehypertensive young adults in the study sample.

**Limitations of the Study**

This study focused on physical activity, which is regarded as an effective BP control intervention for young adults. This study was limited by the fact that the participants were given group assignments based on only one BP measurement and dietary habits and lifestyle were measured based only on drinking and smoking behaviors. Future research should include factors other than physical activity that may influence hypertension in young adults. Another limitation was the convenience sampling approach used. Future research should adopt a more broadly representative approach to sampling to expand the generalizability of the findings.

**Conclusion and Implications**

In this study, the prevalence of hypertension and prehypertension was higher and the mean age of participants was lower than reported in previous studies. The analyses of factors influencing BP classification in university students revealed that gender, being overweight or obese, visceral fat, social support for physical activity, and exercise-impeding factors all influenced the development of prehypertension and hypertension. University students are at a stage in life in which they are establishing their independence from their parents and forming an independent lifestyle. Failure to form healthy habits at this time will impact directly on the prevalence of hypertension during middle and older ages. Therefore, nurses must recognize the importance of healthy habits at this time and actively provide preventative interventions. Accordingly, hypertension in young adults should be prevented and managed to reduce the prevalence of hypertension in all age groups, and related physical exercise interventions should include components of social support and work to eliminate exercise-impeding factors.

**Accepted for publication:** October 4, 2019

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The authors declare no conflicts of interest.

Cite this article as: Choi, E. J., Chang, A. K., & Choi, J. K. (2020). Factors associated with blood pressure classification in Korean university students: A descriptive survey. The Journal of Nursing Research, 28(1), e61. https://doi.org/10.1097/jnr.0000000000000325

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