Study on the Correlation Between Occupation and Chronic Degenerative Disease

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Abstract

Purpose: This study aims to explore the correlation between job and hypertension. Hypertension is a major risk factor such as stroke, myocardial infarction, heart failure, and vascular aneurysms. **Research design, data and methodology:** The data from this study are the 2017 National Health and Nutrition Examination Survey classified into office workers and non-office workers. Frequency analysis was used for general characteristics analysis, and ANOVA test analysis was used for correlation between subjects' basic variables and blood pressure. The post analysis as turey was used to verify the validity of the statistical results. All statistical analyzes were performed using the IBM SPSS 24.0 program. **Results:** There was a difference in the prevalence of hypertension among office workers and non-office workers.

Keywords : Job, White color, Blue color, Hypertension, Sex

JEL Classification Code : I00, I10, I12, I14

1. Introduction

1.1. Necessity of Research

In the past of the 1970s, Korea began to westernize various social styles and lifestyles as ascent of incomes from large-scale industrialization and industrialization increased. These western lifestyles also appear in food life, leading to nutritional imbalance (Kim et al., 2017), due to high-calorie or meat-based nutritional food intake, such as fat or instant food. It appeared as an adult disease (LSD, Life Style Disease) as well as chronic degenerative disease (Lee et al., 2009).

Cancer, heart disease and cerebrovascular disease (Korea Statistics Office, 2019) have been the main causes of death in Korea over the past 20 years, and hypertension, in particular, is one of the factors influencing heart disease and cerebrovascular disease (Park et al., 2003). Adult diseases, such as hypertension, are associated with high age, the causes are very complex and varied, and usually cannot be completely cured. It is also characterized by the high time and cost of management (Lee et al., 2009).

Hypertension is a chronic, degenerative disease in which the blood pressure is higher than the normal range. Blood pressure is summarized by two measurements of the systolic highest blood pressure and diastolic lowest blood pressure. It is called hypertension when blood pressure is

continuously above 140 / 90mmHg (Lee, 2018). Hypertension can be attributed to Korea's own spicy, salty eating habits, and various types of chopped, fermented and soy, miso, and soup meals (Kim & Han, 2006; Kim et al., 2013).

Hypertension, which acts as a major risk factor for stroke, myocardial infarction, heart failure, vascular aneurysm, and lower extremity aneurysms, can also cause chronic renal failure (Lee et al., 2008). Hypertension is one of the national diseases with a prevalence of approximately 30% among adults over 30 years of age. About one-third of adults in the world (estimated to be 1.1 billion people) are pre-existing hypertension. The number one cause of death worldwide is hypertension, as well as hypertension, which is the leading cause of cardiovascular disease (WHO, 2021).

Meanwhile, most adults have "occupation" (Choi et al., 2009) as a means of living. Since these jobs become one of the socio-economic factors, the jobs have a certain pattern of life or behavior, which is related to the eating behavior of the body and mind. After all, it can be said that the causal relationship between occupation and disease, such as professional working environment, income level, workload, intensity of work, form of work, stress, shift work, physical or mental labor, is established (Yong et al., 2011; Kim et al., 2011).

Therefore, this study intends to analyze the relationship between gender occupation and hypertension under the premise that there is a correlation between occupation and hypertension, and to provide health and health care policy & administration implications for the management and prevention of hypertension by occupation or job.

1.2. Group of Occupation

The occupational group used the vocational reclassification item of the health survey questionnaire, and the Korean Standard Vocational Classification item of the NHNS in Table 1. In the 7th NHNS in the form of occupation, the 7th Korea Standard Occupational Classification of Statistics Korea (2018) was classified into 10 occupations as shown in the chart below.

Table 1: The 7th Korea Standard Classification

Korean Standard Classification	International Standard Classification
1. Manager	1. Manager
2. Experts and related workers	2. Experts and related workers
3. Office workers	3. Office workers
4. Service workers	4. Service workers
5. Sales workers	5. Sales workers
6. Agriculture, forestry and fisheries skilled workers	6. Agriculture, forestry and fisheries skilled workers
7. Skilled workers and related skill workers	7. Skilled workers and related skill workers
8. Device machine operation and assembly workers	8. Device machine operation and assembly workers
9. Daily workers	9. Daily workers
10.Soldier	10.Soldier

In table 2, in this study, 1. managers 2. experts and related workers 3. office workers were classified as office workers. Non-office workers are categorized into 4. service workers 5. sales workers 6. skilled workers in agriculture, forestry, and fisheries 7. skilled workers and related skilled workers 8. equipment machine operation and assembly workers 9. daily labor workers, etc. as shown below in table 2.

Table 2: Classification of Occupation Groups

Office work	Non-Office work
Managers, experts and related workers	Service and sales workers, skilled workers in agriculture, forestry and fisheries, skilled workers, machine operators and assembly workers, daily workers

2. Research Methodology

2.1. Survey Subjects

Basically, the 7th 2nd year raw data (2017.01.01. ~ 2017.12.31), which is the 2017 National Health and Nutrition Survey(NHNS), was used as the survey data for this study. A total of 4,190 people (1,920 males, 2,270 females) were surveyed, except for data marked as "no answer" or "unknown" among those aged 20 to 59 who participated in the survey.

2.2. Analytical Methodology

The survey variables were analyzed to represent the Korean people using the method of analyzing the composite sample design data considering the colony extraction variables, variance estimation layers, and weights presented in the 2017 NHNS data. Analysis of general characteristics and basic variables yielded percentages, means, and standard deviations. In order to test the distribution of categorical variables, the analysis of hypertension and components according to the occupational group by gender was analyzed by chi-square analysis, and the correlation between basic variables of subjects and systolic blood pressure and diastolic blood pressure was treated as independent sample t-test. Analysis of variance was performed to determine whether the mean was different between hypertension according to the classification. The post analysis to verify the reliability and validity of statistical analysis was tested by the tukey analysis method, and all statistical analysis was performed using the IBM SPSS 24.0 program, and the significance level was performed at $p<0.001$, $p<0.01$ and $p<0.05$.

3. Research Results

3.1. General Characteristics of the Subject

The total of 4,190 subjects were male and female research subjects aged 20 to 59 years, among which 1,920 men were 45.8% and 2,270 women were 54.2%.

Looking at the differences among the age groups of the subjects, 17.4% in their 20s, 23.3% in their 30s, 28.7% in their 40s, and 30.6% in their 50s were the most.

In table 3, which shows the status of education, it is estimated that 52.7% had the highest degree of college graduates, 36.2% of the high school graduates, 6.8% of the middle school graduates, and 4.3% of the elementary school graduates.

Table 3: Status of Survey Subjects by Education Level

Education	Number	Proportion (%)	Cumulative Proportion (%)
under elementary school	160	4.3	4.3
under middle school	254	6.8	11.1
under high school	1,345	36.2	47.3
more than college	1,959	52.7	100.0
total	3,718	100	100

Table 4 is a table showing the average characteristics of survey subjects such as age and income. Regarding age and income, the survey subjects were male and female adults aged 20 to 59 years, but the average age was about 42 years, and the average monthly average per household was about 514 million won. In addition, it was found that on average, they sleep for about 7 hours a day on weekdays.

Table 4: Average and Standard Deviation of Age, Income and Sleep Time

Variables	Number	Minimum	Maximum	Average	Standard Deviation
age	4,190	20	59	41.91	11.13
income per month	4,178	17	1,500	514.56	320.884
sleep time(hour)	3,716	2	12	6.95	75.943

Table 5 is a chart showing the occupational groups in which the surveyed subjects are classified. In this table, the total occupational groups are largely classified into three categories: office workers, non-office workers, and others (unemployed). Office workers account for 37.7% of managers, experts, and related researchers, and non-office workers are service and sales workers, agricultural and forestry, fishing skilled workers, skilled workers, machine machinery and assembly workers, and daily labor workers, accounting for 34.9%. There was no significant difference in the ratio of office workers to non-office workers, but there were more office workers. In addition, unemployment without a clear job accounted for about 27.6%. The total survey was 4,190, with only 2,691 responding with jobs, and the remaining 1,024 with 27.6% responding unemployed with no clear jobs or unemployed or temporary, daily or part-time jobs.

Table 5: Frequency Analysis of the Occupational Groups of the Survey Subjects

Job	Classification	Number	Proportion (%)	Cumulative Proportion(%)
type	office work	1,394	37.5	37.5
	non-office work	1,297	34.9	72.4
	unemployed	1,024	27.6	100
	total	3,715	100	100

Table 6 shows the presence or absence of hypertension, the disease of this study. Of the 3,937 respondents, 10.5%

answered that they had high blood pressure, and 89.5% answered that they did not, and most of the respondents answered that they did not have high blood pressure. However, 89.5% of respondents with no hypertension were relatively low compared to the proportion of respondents with almost 95% or more of other chronic diseases, such as stroke, myocardial infarction, angina, pulmonary tuberculosis, diabetes, and depression. Conversely, it is presumed that some of the adults aged 20 to 59 years of age may or may not have hypertension.

Table 6: Proportion of Survey Subjects' Response to Hypertension

Hypertension	Number	Proportion(%)	Cumulative proportion(%)
No	3,524	89.5	89.5
Yes	413	10.5	100.0
Sum	3,937	100	100

3.2. Analysis of the General Characteristics and Type of Occupations

Table 7 shows the difference in blood pressure mean according to income, education, obesity, age, binge drinking, and occupation. There are differences in blood pressure for income, education, obesity, age, and binge drinking.

① Income: The lower-income group showed the average difference between systolic and upper-income groups.

② Education: In the case of systolic blood pressure, there is an average difference among all classification groups of education level.

In the case of diastolic blood pressure, there is a difference in average between middle and high school graduates.

③ Obesity: Underweight and normal, there is a difference between the obesity in the pre-obesity stage and the mean between systolic and diastolic blood pressure.

④ Age: In the case of age group, it can be seen that the diastolic blood pressure has a mean difference in all groups, and the systolic blood pressure has no difference between the 20s and 30s, and there is a difference between the 40s and 50s and the average. You can see that there is also a difference in the means.

⑤ Binge: There is no binge frequency, about once a month, less than once a month. There is also an average difference between systolic and diastolic blood pressure once a week and almost every day.

4. Review and Discussion

4.1. Correlation between Subjects' General Characteristics and Hypertension

In the Ahn(2009)'s study, age, income, marriage, education, and smoking did not differ between the normal and hypertensive groups. Drinking was found to have a direct relationship, which is difficult to generalize as it is measured by high-income people over the age of 50. However, according to Park's (2016) hypertension risk factors, education level, marital status, subjective health status, diabetes, cancer, chronic lung disease, heart disease, obesity according to BMI, smoking, and drinking were significantly different from hypertension.

In this study, in the basic variables of the survey subjects, gender, income, age, education level, number of household members, marital status, subjective body perception, smoking, drinking, binge drinking, obesity, etc. were statistically significant, but stress was clearly not correlated.

1) Gender
The prevalence of hypertension in men and women in this study was 15.4%, men 14.7%, and women 7%. In the study of hypertension among men and women, the prevalence was high in women (Park et al., 2016), and in contrast, in many studies, there were many men (Jeong et al., 2009). High blood pressure prevalence data (Statistics Office, 2019) also showed high results for men. However, the prevalence of women after age 70 may be higher than that of men, which is thought to be a change in menstrual hormone due to menopause.

2) Income
In this study, the lower-income group showed an average difference between the higher-income group and the systolic blood pressure. A study by Ahn (2009) found that there is no direct relationship between income and hypertension, and Lee (2008) found that cancer is rather independent of income, but that hypertension, heart disease and diabetes have significant differences in income. It was argued that income greatly influences nutrition, housing, daily life and medical use.

3) Education
For systolic blood pressure in this study, there was an average difference among all classification groups of education level. In the case of diastolic blood pressure, there is a difference in average between middle and high school

Table 7: Analysis of variance on basic variable and blood pressure

variables	classification		systolic					diastolic				
			N	mean	sd	p	Post-Hoc test	N	mean	sd	p	Post-Hoc test
income	lower		970	115.63	15.155	0.012	2	970	76.30	10.152	0.835	
	middle	lower	991	114.99	14.973		1,2	991	76.63	10.278		
		upper	971	113.84	14.151		1	971	76.25	9.898		
	upper		989	113.80	14.393		1	989	76.46	10.155		
education	under elementary school		159	124.31	17.006	0.001	4	159	79.66	9.483	0.001	2
	under middle school		254	120.98	15.873		3	254	78.39	10.624		2
	under high school		1,345	115.25	14.881		2	1,345	76.39	10.206		1
	more than college		1,957	112.06	13.390		1	1,957	75.73	9.966		1
number of household members	1		338	116.96	16.449	0.005	1	338	77.87	10.134	0.075	
	2		721	115.54	15.852		1	721	76.21	10.024		
	3		1,219	114.15	14.136		1	1,219	76.02	9.935		
	4		1,292	113.84	14.240		1	1,292	76.49	10.086		
	5		299	114.23	13.503		1	299	76.30	11.131		
	more than 6		62	115.40	14.177		1	62	77.53	9.912		
obesity	under weight		173	106.23	12.408	0.001	1	173	71.77	8.949	0.001	1
	normal		1,596	110.26	13.352		1	1,596	73.25	8.883		1
	pre - obese		810	115.46	13.570		2	810	77.06	9.604		2
	obese	1 stage	1,093	120.13	15.087		3	1,093	80.24	10.094		3
		2 stage	183	122.60	13.428		3	183	83.03	10.358		3
		3 stage	43	123.49	13.620		3	43	83.00	9.967		3
age	20's		670	109.64	11.316	0.001	1	670	71.95	8.956	0.001	1
	30's		912	110.99	12.567		1	912	75.12	10.232		2
	40's		1,138	114.14	14.176		2	1,138	77.53	10.211		3
	50's		1,211	120.39	16.267		3	1,211	78.81	9.603		4
binge drinking	never		1,814	112.74	14.654	0.001	1	1,814	74.76	9.441	0.001	1
	less than once per month		683	113.28	14.560		1	683	75.47	10.147		1
	once per month		556	113.78	12.869		1	556	76.16	9.965		1
	once per week		604	119.44	14.765		2	604	80.48	10.228		2
	everyday		236	121.93	14.482		3	236	82.32	10.248		3

graduates. In a study by Ahn (2009), age, income, marriage, education, and smoking showed no significant difference between the normal and hypertensive groups. In fact, gender, age, income, marriage, education, etc. are classified as confused variables (Lee et al., 2008) in many studies, and it can be seen that these variables may have various results depending on the characteristics or purpose of the study. Chronic kidney disease is a disease closely related to hypertension. In this risk factor study (Kim, 2018), income and education appeared to be factors affecting kidney disease.

4) Age

In this study, the prevalence of hypertension was 1.3% in their 20s, 2.5% in their 30s, 8.3% in their 40s, and 23.6% in their 50s. As shown in Figure 22, it can be seen that the prevalence of hypertension is higher as men and women increase in age. These results also showed that the prevalence of hypertension increased with age in both men and women in the study of Lee and Lee (2014).

5) Smoking and drinking

In this study, both smoking and drinking (including binge drinking) showed positive association with hypertension. There is no frequency of binge drinking in binge drinking, once a month, or less than once a month. There is also an average difference between systolic and diastolic blood pressure once a week and almost every day. In the risk studies of smoking and drinking by disease (Lee, 2009), as smoking and drinking increased, levels of liver AST, ALT, γ-GTP, LDH, etc., as well as increased hyperlipidemia in the blood, eventually resulted in dysfunction of the liver and blood vessels. In addition, the prevalence of hypertension was lowered as adults' higher grip strength (Lee, 2017) argued that smoking and drinking inhibited the grip strength of adults. Kim(2009) studies risk factors for hypertension in smoking and drinking presented similar conclusions.

6) Stress

Basically, stress is thought to be a risk factor for raising blood pressure. However, in this study, there was no clear relationship between hypertension and cross-analysis of stress (p<0.284), and systolic (p<0.978) and diastolic blood pressure (p<0.531). There was no clear relevance.

In the study of Kim (2006), the relationship between mental stress and coronary artery disease was analyzed, and stress increased blood pressure in relation to vascular damage. Kim (2015), who studied socio-economic factors affecting adult hypertension, also had no significant results in both stressful (p<0.4871) and female (p<0.4394). There is a subjective aspect of whether or not stress is perceived,

so the tendency of individuals can vary greatly, and in some cases, the stress situation is forgotten after time. Rather, if you think about it reversely, hypertensive patients have less tendency to feel anger in situations that cause anger and have a low response among certain angers (Park, 2002).

7) Obesity

Obesity in this study showed significant results with hypertension (p< 0.001). That is, there is a difference between the average of the obesity, systolic (p<0.001) and diastolic blood pressure (p<0.001) in obesity, pre-obesity, and diastolic blood pressure (p<0.001). Obesity, hypertension and hyperglycemia (Park et al., 2014; Lee, 2018) showed similar results. However, obesity is not only the cause of hypertension, but also other adult diseases such as diabetes (Wang et al., 2011), myocardial infarction, gallbladder disease, hyperlipidemia, and joint disease (Park, 2014).

4.2. Occupational Impact Factors on Hypertension

4.2.1. Influence Factors by Occupation, such as Workers and Non-office Workers

The study results of this occupational group and hypertension showed that there was a difference in the prevalence of hypertension between 1,394 office workers and 1,297 non-office workers of 2,691 jobs with a significant level (p<0.001). Specifically, hypertension was 117 out of 1,277 office workers (9.1%), and 187 out of 1,110 non-office workers (16.8%).

It was also found that there was significance (p<0.001) in variance analysis with occupations analyzed by dividing blood pressure into systolic blood pressure and diastolic blood pressure in more detail. Both systolic and diastolic blood pressures are similar for white-collar and unemployed, but it is thought that there is a difference between white-collar and non-white-collar workers and unemployed and non-white workers. It is judged that non-office workers are mostly physically active or active because there are many production activities or sales work.

In the results of hypertension studies related to commercial workers over 15 years of age, including temporary workers and daily workers, 4.114% of commercial workers, 6.336% of temporary workers, and 10.516% of daily workers are temporary workers and daily workers who have a more unstable working environment than commercial workers. The prevalence of hypertension was higher. Kim et al. (2012), who studied office workers and non-office workers in the Busan area, had a high prevalence of hypertension with 7.2% of office workers and 7.6% of non-office workers (production workers). The reason for the high prevalence of production workers was the reason of the relatively elderly population, drinking and

smoking.

For a more in-depth discussion of this, in the study of hypertension related to obesity and physical activity by Park (2015), the risk of hypertension decreases as the physical activity increases.

However, the study showed that such a tendency was not observed in men, and the increase in physical activity did not attenuate the increase in the risk of hypertension caused by BMI.

Other factors such as drinking, smoking, or unstable work patterns are thought to be factors leading to increased blood pressure.

4.2.2. Influence Factors Related to White-collar or Non-white-collar jobs

The prevalence factors of hypertension in male and female white-collar workers are job size, working hours, night work and stress (Kim & Kim, 2015), and major factors affecting work experience, working hours, stress, and exercise are factors affecting hypertension of male white-collar workers. Presented. In the end, the white-collar workers were mostly sedentary, and the main factors were working hours, career and stress.

Agriculture is the representative occupation group as non-office workers, and among the 10 occupation groups in Korea, the prevalence of hypertension among farmers is 32.0%, which is the highest among the 10 occupation groups (Lee, 2018). The main risk factors for hypertension in this study are age, diabetes and alcohol consumption. Smoking, obesity, etc. In addition, research on hypertension related to rural and agricultural subjects

Age, obesity (Kim et al., 2005), BMI, family history, diabetes and drinking, etc. (Lee & Kim, 2013), BMI, triglycerides, drinking, etc. The variables of thumb, etc., were concluded to be the main risk factors for hypertension.

5. Conclusions

5.1. Summary and Conclusions of the Study

This study uses the 7th 2017 National Health and Nutrition Survey source data (2017.01.01 ~ 2017.12.31) to work as a clerical worker according to the gender of men and women between 20 and 49 years of age (managers, experts and office workers). And non-office workers (service sales workers and machinery, simple labor workers, etc.), and attempted to find out how this male and female occupational group was related to hypertension.

A total of 4,190 (1,920 males, 45.8%, 2,270 females, 54.2%) were surveyed, but 1,394 office workers and 1,297 non-office workers were excluded, except for 1,024 people who said they had no jobs or were unemployed out of 3,715,

excluding missing data. In total, 2,691 people were actually surveyed.

The average age of the survey participants was about 42 years old, with an average sleep time of about 7 hours per day, and most of them were mostly in Gyeonggi Province 25.7%, Seoul 20.6%, and Incheon 6.6%. The number of co-resident households was usually 32.9% for 4 people and 31.3% for 3 people, and the income level was almost the same in the four categories, namely, lower, middle, upper, upper, and upper. Education was the highest among college graduates (52.7%) and high school graduates (36.2%). 37.5% of the white-collar workers, 34.9% of non-white workers, and 27.6% of the unemployed were employed. The average height of the subjects was about 165 cm, body weight of about 65 kg, systolic blood pressure of 115 mmHg, and diastolic blood pressure of 76 mmHg. The family history of chronic diseases was about 64% and obesity was about 33.8%. Currently, there are almost no chronic diseases such as stroke, myocardial infarction, and diabetes, and the prevalence of hypertension is 10.5%.

The basic research conclusions derived from this study are as follows.

First, the main variables related to the prevalence of hypertension are gender, age, income, education, number of household members, marriage, obesity, smoking, drinking and binge drinking, and family history.

Second, the prevalence of hypertension was higher in males than females, with 63.2% of men and 36.8% of women ($p<0.001$). At the educational level, the prevalence of high blood pressure between high school graduates and college graduates accounted for 75.62% of the total ($p<0.001$). That is, the higher the educational background, the higher the prevalence of hypertension.

Third, at the income level, the lower-income group had an average difference between the groups above the upper-middle income group and systolic blood pressure ($p<0.012$). However, diastolic blood pressure was not significant ($p<0.835$).

Fourth, major chronic diseases and related factors related to the prevalence of hypertension are stroke, myocardial infarction, angina, diabetes, high cholesterol and triglycerides ($p<0.001$).

Fifth, there was a difference ($p<0.001$) in the prevalence of hypertension between white-collar workers and non-white-collar workers.

Unlike the previous study in this study, the new result is that stress did not show a significant significance with hypertension, and the income level was also difficult to have a great relationship with diastolic blood pressure in addition to systolic blood pressure. In addition, it was drawn that there was no significant relationship with respiratory diseases.

5.2. Research Limitations and Suggestions for Future Research

In the previous study related to hypertension, stress was considered as a major risk factor for hypertension. This study had no clear significance, and classified the job groups in more detail to find the correlation between work characteristics of each job group and hypertension. It is thought that there will be policy implications or necessities in the management and prevention of hypertension.

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