A study on dietary habits, health related lifestyle, blood cadmium and lead levels of college students

Nari Shin¹, Whajin Hyun², Hongmie Lee³, Mansoo Ro⁴ and Kyunghee Song⁵
¹Department of Food and Nutrition, Myongji University, Nam-dong, Cheoin-gu, Yongin, Kyeonggi 449-728, Korea
²Department of Food and Nutrition, Joongbu University, Chungnam 312-702, Korea
³Department of Food Science and Nutrition, Daejin University, Kyeonggi 487-711, Korea
⁴Seoul Breast and Thyroid Clinic, Seoul 135-010, Korea

Abstract
This study was performed in order to investigate dietary habits, health related lifestyle and blood cadmium and lead levels in female college students. 80 college students (43 males and 37 females) participated in the survey questionnaires. Body weight and height, blood pressure, and body composition were measured. The systolic blood pressure of male and female students were 128.9 ± 13.9 and 109.8 ± 12.0, respectively. The diastolic blood pressure of male and female students were 77.1 ± 10.3 and 66.0 ± 6.9, respectively, showing that male students had significantly higher blood pressure than female students (P < 0.001). The BMI of male and female students were 23.4 ± 3.3 and 20.2 ± 2.3, respectively. Most male students were in the range of being overweight. The dietary habits score of female students was significantly higher than that of male students (P < 0.01). The blood cadmium level of male and female students were 0.54 ± 0.23 and 0.52 ± 0.36, respectively. There was no significant difference between male and female students. The blood lead level of male and female students were 1.09 ± 0.49 and 0.59 ± 0.45, respectively. The blood lead level of male students was significantly higher than that of female students (P < 0.001). The blood cadmium level of smokers and nonsmokers were 0.69 ± 0.29 and 0.49 ± 0.29 respectively (P < 0.05). The blood cadmium level of smokers and nonsmokers was significantly higher than that of nonsmokers (P < 0.05). The blood lead level of smokers and nonsmokers were 1.09 ± 0.43 and 0.80 ± 0.54, respectively. The blood lead level of smokers was significantly higher than that of nonsmokers (P < 0.05). Therefore, proper nutritional education programs are required for college students in order to improve their dietary and health related living habits.

Key Words: Dietary habit, blood cadmium, blood lead, college students

Introduction
Adequate and balanced nutrient intake is necessary to maintain the health of the body as well as of the mind and to prevent diseases. Also, the establishment of proper dietary habits is very important for desirable nutritional practices. Proper dietary habits can decide physical and psychological health status of individuals, thus poor dietary habits not only impair physical growth but also greatly affect the emotional development [1].

College students are no longer under the supervision of their parents for their dietary life and may face many problems in the quality of their diets when they become to manage their lives independently without receiving proper education on dietary life [2]. Also, dietary behavior of college students is very sensitive to the changes of social environment and going towards much undesirable directions such as irregular meals, frequent meal skipping, eating out and overeating, excessive drinking and smoking that are affected by class schedules without considering meal time, increased free time, part time job, and get-together with friends and dating [3].

These could be confirmed from the results of regional survey [4,5] in college students that equivocally pointed large numbers of cases which caused obesity or underweight, anemia, gastrointestinal tract diseases, and nutritional imbalance by unbalanced intake of mainly cheap, convenient, and preferable foods rather than focusing on nutrition or hygiene due to dietary habits such as irregular meals, meal skipping, overeating, deviated food habit, late night snack, excessive intake of ready-to-eat products, excessive smoking and drinking, limited pocket money, and lack of nutritional knowledge.

While the smoking rate of men and women of 19 years and older has been decreased recently by 39.6% and 2.2%, respectively, in Korea, the smoking rates of men and women between 20-29 years were reportedly higher as 40.9% and 5.9%, respectively, in Korea, the smoking rates of men and women between 20-29 years were reportedly higher as 40.9% and 5.9%, respectively, than those of other age groups [6]. Not only smoking but also free radicals that are generated inside the body by carbon monoxide, nicotine, and tar contained in the cigarette itself are elucidated as risk factors for various diseases [7].
habit could even increase the chance of drinking, which ultimately changes dietary habit and life style, further affects nutrition and health status of the body.

Metals play important roles in numerous physiological actions inside the body, but if heavy metal concentrations are in excess above the normal level, these can threaten the health. Heavy metals are substances with specific gravity more than 5g/cm^3 and have been used for several thousand years, and can induce various diseases when inhaled or ingested through either air or food stuffs. Heavy metals, after being absorbed and bound to tissues, are not easily excreted from the body, and their accumulation is increased by age due to their long half-life, ultimately causing various health defects [8]. Major heavy metals that threaten health include cadmium, lead, and mercury [9]. It has been known that elevation of blood cadmium level, by increasing systolic blood pressure as well as diastolic blood pressure increased the risk of hypertension [9]. Acute lead poisoning induces headache, unstable emotion, abdominal pain, and various symptoms related to the nerves, and it has been known that chronic exposure to lead further develops renal tubule damages [8].

This study was conducted to provide the data which can be a database in improving dietary habit as well as lifestyle of college students in Korea by finding out current address of health status of college students and related factors through investigating difference between males and females in physical characteristics, health related factors, dietary habit, heavy metal levels in blood, and other blood profiles.

Subjects and Methods

Subjects

This study was conducted in 43 male college students and 37 female college students who did not have particular diseases in Gyeonggi-do area. Data were collected during 6th to 8th November, 2008, anthropometric measurements for the subjects were performed and blood samples were collected, and then survey questionnaires were distributed to the subjects for responding by filling it, and the responded contents were confirmed during interview session.

Anthropometric measurements

General characteristics of subjects including gender, age, residence type, and household income and health related parameters of exercise, drinking, and smoking status were investigated. Height and weight of subjects were measured using Fatness measuring system (DS0102, JENIX, Korea) by making subjects stood after removing shoes while maintaining straight posture with light cloths on. Blood pressure of subjects was measured by Automatic blood pressure monitor (FT-500R, Korea) while subjects were seated on the chair and had rest to measure systolic blood pressure as well as diastolic blood pressure. For the analysis of body compositions, InBody was used implementing Direct Segmental Bioelectrical Impedance Analysis Method (DSM-BIA) per each body part. Subjects were asked to remove metal objects from their body and measurements were carried out by letting the subjects stood on the machine with bare feet.

Dietary habit

Dietary habits survey was conducted via questionnaire. Questionnaire was constituted with a total of 12 questions about meal regularity, breakfast skipping, deviated food habit, attitude during purchasing the foods, binge, cooking method, preference for sweet taste and salty taste, and the responses were categorized as ‘Never’, ‘Sometimes’, ‘So-so’, ‘Almost always’, and ‘Always’. For positive questions, 1 point was given to ‘Never’, 2 points to ‘Sometimes’, 3 points to ‘So-so’, 4 points to ‘Almost always’, and 5 points to ‘Always’, while for negative questions, inverse scoring were given accordingly.

Blood analysis

Fifteen ml of blood samples were collected from the subjects in the morning before breakfast after at least 10 hours of overnight fasting after dinner on the previous day of measurement. Ten ml of venous blood was collected into a plain tube using vacuum blood collecting tube to analyze iron, calcium, and magnesium levels in the blood. Collected blood samples were left at ambient temperature for 30 minutes for coagulation followed by centrifuge at 3,000 rpm for 5 minutes and then stored in the refrigerator. Five ml of venous blood was collected into an EDTA tube in which anticoagulant (EDTA) was contained using vacuum blood collecting tube for the analysis of plasma cadmium and lead levels, RBC, WBC, Hb, HCT, MCV, MCH, MCHC, and platelet. These anticoagulant and blood sample mixtures were mixed well for 6-8 hours and then kept under the ambient condition.

Blood cadmium and lead levels were analyzed by using atomic spectrophotometer (AA-6800, Shimadzu), and iron, calcium, and magnesium levels were analyzed using Automatic Blood Analyzer, and other parameters of RBC, WBC, Hb, HCT, MCV, MCH, MCHC, and Platelet were also measured.

Statistical analysis

The data were analyzed using SPSS (Statistical Package for the Social Science, version 14.0). Chi-square analysis was performed to find out general characteristics and health related parameters of the subjects, and student t-test was conducted to find out physical characteristics, dietary habit, and blood profiles between male and female students.