

Original Article

## A Survey for Health-related Factors of Middle School Students in Daejeon

Chang-Gue Son

Liver and Immunology Research Center, Daejeon Oriental Hospital, Daejeon University

**Objective:** To investigate the situation of health-related main factors of Korean middle school adolescents.

**Methods:** Data were collected via a self-reporting questionnaire from 2,254 students (650 boys and 1,604 girls), and their sleeping, exercise, dietary pattern, stress, physical problems, and taking of food supplements were analyzed.

**Results:** Korean middle school students sleep about 7 hours per day, and they exercise less than 4 hours per week. Around 13% of the students skip breakfast nearly every day. 35% of the students were under severe stress, and 38% have reported at least one symptom of physical distresses including gastrointestinal disorders or headaches. 31% of the students took a functional supplement, especially one with vitamins as the most favored one, and ginseng and herbal drugs coming second and third.

**Conclusion:** This result first reports a general feature of health-associated factors in middle school students. This study in the future will be basic information to develop medical supports for adolescents using traditional Korean medicine.

**Key Words :** Health, quality of life, adolescent, student, stress, traditional Korean medicine

### Introduction

The adolescence period is a transitional stage in human development. The balanced and systematic care of health in this period is very important for a strong basis for the rest of one's lifetime<sup>1)</sup>. Adolescence has a characteristic of strong activity and notable change in aspects of body, emotion, and mentality. Then, it has been well known that Korean students in adolescent age are generally under much stress related to collage entrance and severe educational competition<sup>2)</sup>.

There have been many reports focusing on health-related environments and outcomes which have investigated the traits of Korean adolescents<sup>3)</sup>.

Recently, a few studies have raised alarm at the increasing rate of suicide<sup>4,5)</sup>. Many studies represented early occurrence and high incidence of metabolic syndrome<sup>6-8)</sup> as well as spinal disorder in the adolescent population<sup>9)</sup>. These epidemiology-associated clinical reports are very important in order to build any social system for improvement of health standards of adolescents.

Traditional Korean medicine (TKM) is expected to contribute to preventive medicine and improvement of quality of life in the future. So, TKM needs to make an effort for production of adolescent-related data, such as their current conditions and changing patterns of health-associated factors. One group investigated the association between growth and

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· Correspondence to : Chang-Gue Son

Liver and Immunology Research Center, Daejeon Oriental Hospital of Daejeon University, 22-5 Daeheung-dong Jung-gu, Daejeon 301-704, Republic of Korea

Tel : +82-42-229-6723, Fax : +82-42-257-6398, E-mail : ckson@dju.ac.kr

body composition in middle school students<sup>10)</sup>, and another group examined the dissimilarity of visual display terminal syndrome among different constitutions<sup>11)</sup>.

The present study aimed to build an overview of health-related factors of middle school students in Korea via a sample group in a city. This study would provide useful data to design a health-improving program for adolescent population using TKM.

### Methods and Subject

#### 1. Study design and data collection

This study was a survey research to investigate the general status of health-associated main factors of Korean middle school students. Data were collected from 2,254 middle school students in Daejeon city. All students from 60 classes of two middle schools provided us with their answers on the questionnaire during June to August of 2009. The composition of boy and girl students was 29% and 71% respectively.

#### 2. Contents of questionnaire and a statistical analysis

The questionnaire was composed of seven questions (Table 1). Two questions (2 and 5) were designed to

select one among three given choices while five questions were to describe their own state. All answers were recorded according to each student. Data were analyzed by appropriate statistical methods such as frequency test, t-test,  $\chi^2$ -test (chi-square test), and ANOVA using PASW Statistics 17 program.

### Results

#### 1. Sleeping, exercise and breakfast

Through the question on sleeping habits, the average amount of daily sleep of middle school students was 436±69 min. Generally, the bed time of adolescents was around 11:36 pm, and the higher their grade was, the later they went to sleep. There was no statistical difference between boy and girl students.

The total hours for exercise outside regular school classes during one week were 264 and 185 min for boys and girls, respectively. The statistical difference between boys and girls was significant ( $p < 0.01$ ), while the difference among grades didn't reach statistical significance ( $p > 0.05$ ).

76.9% of boy students and 70.8% of girl students had breakfast every morning whereas 10.0% of boy students and 13.8% of girl students usually skipped their breakfast (Table 2).

**Table 1.** Questionnaire and methods of answer

1. When do you usually go to sleep and wake up?	Describe (Sleep __, Wake up __)
2. How frequently do you skip breakfast?	Choice (Every day, Often, Rarely)
3. How many hours do you exercise (outside gym class) during one week?	Describe (_____ hours)
4. Do you normally have any physical problems? If you have, what are they?	Describe (None or _____)
5. How much do you usually feel stress?	Choice (None, Moderate, Severe)
6. How do you try to relieve your stress?	Describe (_____)
7. Do you take a complementary or functional food supplement for health? If you do, what is it?	Describe (None or _____)

**Table 2.** Analysis for factors of exercise, sleeping and breakfast

Grade	Boy students			Girl students		
	Hours of Sleep (min/day)	Hours of exercise (min/week)	Skipping breakfast (Often/Most %)	Hours of Sleep (min/day)	*Hours of exercise (min/week)	Skipping breakfast (Often/Most %)
First	456±71	260±365	13.1/8.0	449±60	226±657	13.5/11.8
Second	450±70	270±699	14.2/11.9	431±70	166±421	16.4/15.0
Third	422±60	261±304	11.8/10.0	424±67	163±540	16.3/14.7
Average	444±69	264±494	13.1/10.0	433±69	185±551	15.4/13.8

Values were expressed as medium ± standard deviation.

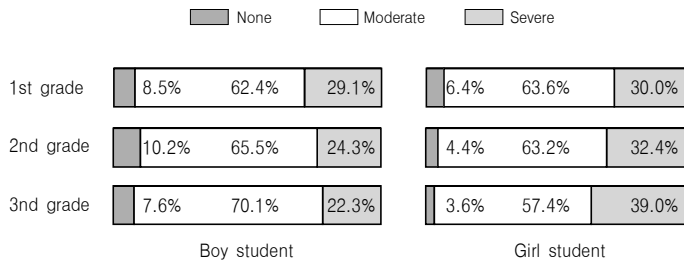
Spending time for exercise was compared between boy and girl students using Student's t-test. \* p <0.01

**2. Severity of stress and ways to relieve stress**

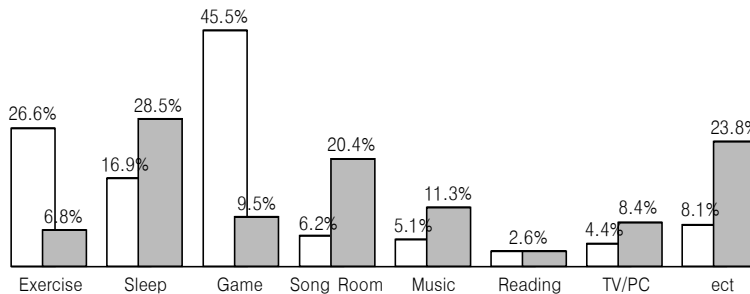
Regarding stress, girl students reported more frequent and severe stress than boy students (p <0.01). 25.2% of boys and 34.0% of girls self-reported that they were under severe stress regularly (Fig. 1).

Computer or video games, exercise, sleeping, and

karaoke were selected as favorite ways to relieve their stress by boy students while girl students chose sleeping, karaoke, listening to music, games, and watching television (Fig. 2). The patterns of those selections were significantly different between boy and girl students (p <0.01).



**Fig. 1.** Stress status of middle school students according to sex and their grade



**Fig. 2.** Middle school students' methods to relieve stress

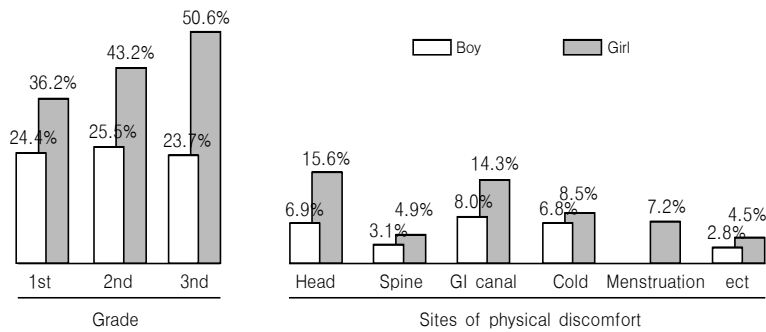


Fig. 3. Self-reported physical complaints among middle school students according to frequency rate (left) and main body site (right)

### 3. Common physical problems

38.1% of middle school students reported that they have at least one physical discomfort regularly. The rate of girl students (43.6%) was much higher than that of boy students (24.6%) with statistical significance ( $p < 0.01$ ). A grade-dependent increasing pattern was observed in girl students while no difference was seen within boy students (Fig. 3).

The most frequent physical complaints of boy students involved gastrointestinal problems such as dyspepsia, abdominal discomfort, abdominal pain, or diarrhea. Also, headache, dizziness, lumbago, cervical spine pain, and catching a cold were included. Headache was the most prevalent physical problem in girls followed by gastrointestinal discomfort,

catching a cold, and dysmenorrhea (Fig. 3).

### 4. Medicines or functional food taken by middle school students

Around 30% of all middle school students took one of the functional supplements. The consumption rate slightly decreased among higher grade students in both boys and girls. The most popular supplement used by middle school students was vitamins. Among students using functional supplements, 45% of boy and 59.2% of girl students took vitamins. Ginseng and herbal drugs stand second and third respectively (Fig 4). Both sex and grade had no influence on making statistical difference ( $p > 0.05$ ).

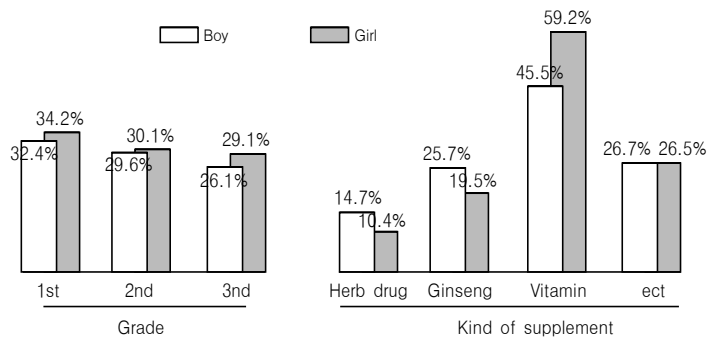


Fig. 4. Use frequency of functional supplements in middle school students according to grade (left) and their main choice (right)

## Discussion

Adolescent population (from 10 to 19 years old) is estimated at about 14% of the total population according to Statistics Korea's report in 2009. Among them, middle school students are around two million, representing 4.5% of the total population<sup>12)</sup>. Adolescents will play a most important role in future society, so careful attention should be paid to their health status. This study aimed to survey the health-related life factors of adolescents via 2,254 middle school students living in Daejeon city.

According to the study results, students' sleeping time starts around midnight (data not shown), and the general duration of sleep was about 7 hours. This result was in accordance with previous observation made of middle school students in Seoul<sup>13)</sup>. The amount of exercise was deficient. Girl students are reported to spend less than 5 hours a week in exercising. Analysis of data from the 2001 National Health and Nutrition Survey reported that 17% of students (from elementary to high school) skipped breakfast<sup>14)</sup>. These data's are well correlated with the current result, in which 10% of boy students and 14% of girl students usually skipped a morning meal.

These results represent poor lifestyle behavior among Korean adolescents, such as "late and lack of sleep, and insufficient exercise as well as improper diet habits". This is reflected in the poor level of quality of life of middle school students. This finding may propose a strong requirement of new policies, such as lengthening physical education classes and providing a breakfast meal at school. The results above were relevant with students' answers about their stress and physical discomfort. 35% of the students were under severe stress conditions, and 38% of them have been troubled with at least one stress-related physical problem. These psychological and physical problems were more prevalent in girl than boy students. This result was not much different with data from high school students (data not shown).

It is supposed that many middle school students are under stress about academic competition and high school entrance. It is well known that heavy stress is associated with various physical disorders<sup>15)</sup>. The problems with the digestive system were most frequent in boy students whereas headache was a top complaint for girls. There are many reports that severe stress and lack of physical activity are connected to those two disorders<sup>16-20)</sup>. Girl students were more vulnerable to both conditions, about twofold compared to boys. This is assumed to be a cause of high sensitivity against emotional stress and lack of exercise among girl students. They chose sleeping and karaoke to relieve stress, while boy students played games and exercised.

For their health improvement, 31% of students usually took at least a functional supplement or herbal drug. Among the students using supplements, vitamins was the most favorite, followed by ginseng and herbal medicine. Herbal medicine was between 10% and 15%, which was around half the proportion of ginseng or red ginseng. Price, convenience for use, and efficacy might affect their choice. We need to consider a strategy for the expansion of herbal medicine in adolescent population like ginseng products.

These results are limited due to stemming from one regional city-based investigation. However, this study is the first to report adolescents' health-related status, which is essential to expanding the application of TKM for Korean adolescents. This study may contribute to research for improvement of adolescent health or development of prophylactic medicine using TKM in the future.

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