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A comparative study on dietary behavior, nutritional knowledge and life stress between Korean and Chinese female high school students

Sohwan Son[1], Yoona Ro[2], Hwajin Hyun[3], Hongmie Lee[4] and Kyunghee Song[1§]

[1]Department of Food and Nutrition, Myongji University, 116, Myongji-ro, Cheoin-gu, Yongin, Gyeonggi 449-728, Korea
[2]Columbia University, 116th Street and Broadway, New York, NY 10027, USA
[3]Department of Food and Nutrition, Joongbu University, Chungnam 312-702, Korea
[4]Department of Food Science and Nutrition, Daejin University, Gyeonggi 487-711, Korea

BACKGROUND/OBJECTIVES: Dietary behavior and life stress in adolescence is related to growth rate and learning ability. This study was conducted to identify the relations between dietary habits, dietary attitude nutritional knowledge and life stress among high school girls in Korea and China.
SUBJECTS/METHODS: The subjects of this study were 221 high school girls in Korea and 227 high school girls in China. The questionnaire were about dietary habits, dietary attitude, nutritional knowledge and life stress.
RESULTS: The dietary habits of chinese girls were healthier than those of Korean girls with a significant difference ($P < .001$). There was no significant difference in dietary attitude between Korean girls and Chinese girls. Korean girls had more nutritional knowledge than Chinese girls with a significant difference ($P < .001$). Korean girls did less physical exercise but spent more time watching TV and using PCs, compared to Chinese girls. Korean girls' degree of confidence in nutrition information that they had learned and their performance in their real lives were low. Also, they had a low level of awareness of the need for nutritional education. There was no significant difference in life stress between the two groups. Dietary habits had a significantly negative correlation with life stress in both Korean and Chinese girls ($P < .01$, $P < .001$). As for Chinese students, dietary attitude had a negative correlation with life stress with a significant difference ($P < .05$). As for Korean girls, nutritional knowledge had a negative correlation with life stress with a significant difference ($P < .05$), which means as life stress was less, dietary habits were better.
CONCLUSIONS: This study shows that effective nutrition education programs should include components that encourage application of learned nutrition information to real life, increase physical exercise and reduce life stress.

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INTRODUCTION

Adolescence is a period between childhood and adulthood, where physical and sexual development is achieved. This period is very important because not just physical development but also psychological and social development occur rapidly. Nutritional status in adolescence is closely related to growth rate, sexual maturity, learning ability and work efficiency. Recently, as the burden of school work on students has increased, a balanced diet and healthy dietary habit can positively influence the academic performance of high school students [1].

As high school students spend most of their time in their schools, they eat school meals for lunch, and sometimes even for dinner, at their schools. Therefore, if they cannot eat various kinds of food in the school meals, they may have a malnutrition problem. Adolescents are pushed from excessive studying and their uncertain future and do not receive a proper nutritional education, which can lead to dietary problems, such as skipping breakfast, unbalanced diet, irregular eating times, frequent consumption of processed food or fast food and eating at night, without the right knowledge about food and nutrition. Stressed adolescents can experience dietary habit changes, such as changes in the consumption amount, flavor and types, and psychological changes [2]. If adolescents cannot relieve their stress, they probably suffer from various problems such as anxiety, depression, suicide, early stage of mental diseases, which can have a bad impact on the society. Dietary problems such as binge eating are seen in the adolescent period because of inner maladjustment caused by stress and lack of control [3], or because of physical and psychological changes caused by

§ Corresponding Author: Kyunghee Song, Tel. 82-31-330-6206, Fax. 82-31-330-6200, Email. khsong@mju.ac.kr
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hormone changes [4]. Female students are more vulnerable to physical symptoms caused by stress than male students, and Korean adolescents reportedly go through physical symptoms more than foreign adolescents [5].

Korea and China are seeing dietary changes because of social and economic development. Wang *et al*. [6] developed the nutrition transition model to assess dietary consumption status in countries. He analyzed that Korea is in a shift from the fourth to fifth pattern and China is in a shift from third to fourth pattern. According to a comparative study on diet between Korean college students and Chinese college students, dietary habits in regular eating and eating breakfast of Chinese students were better than that of Korean students. Dietary habits in drinking alcohol and carbonated drinks of Korean students were better than that of Chinese students [7]. In a comparison between Chinese children's diet and American children's diet, Chinese children had better dietary habits in terms of how often they ate with their families, snacking and consuming soda and fast food [8].

Causes of stress during the adolescent period are family environment, school life, academic performance, personal reasons and circumstances. In particular, going to college, poor academic results and lots of homework were more serious stress factors out of stress factors related to academic performance. In short, education focused on college entrance examination influences students' mental health. College entrance rates in Korea and China in 2010 were similar at 81.5% and 83.3%, respectively [9,10], but stress factors of adolescents in the two countries are probably different for cultural and social differences between Korea and China.

This study was conducted to identify dietary habits and their related factors and life stress factors in high school girls in Korea and China, to compare the results from factors, and to suggest improvements in nutritional education and nutritional management for adolescents.

SUBJECTS AND METHODS

Subjects

The subjects of this study were first or second grade girls of high schools in Yongin city, Korea and Weihai city, China, and a survey using questionnaires was conducted from November, 2011 to December, 2011. Students with uncompleted questionnaires were excluded. Thus, 221 Korean students and 227 Chinese students were included.

Study content

The questionnaires were distributed in high schools and students wrote the answers directly. The questions were about general information on the respondents, dietary habits, dietary attitude, nutritional knowledge, awareness of nutritional education and life stress.

General information consisted of age, height, weight, parents' educational background, parents' vocation, monthly income of the family. BMI (body mass index, kg/m^2) was calculated from the height and weight, and the BMI results were classified into underweight, normal weight and overweight according to the Asia-Pacific Perspective (2000).

The dietary habit consisted of 9 questions, including regularity of breakfast, adequate amount of intake during meals, balance of meals, and the intake of green-orange colored vegetables, fruits, vegetables, protein foods, milk, laver and kelp. Each question was scored by the Likert 5-point scale: "always" 5 points, "almost always" 4 points, "so-so" 3 points, "seldom" 2 points and "never" 1 point. Dietary habit score was calculated by averaging the points from the questions. The dietary attitude consisted of 15 questions each question was scored by the Likert 5-point scale: "very positive" 5 points, "positive" 4 points, "acceptable" 3 points, "negative" 2 points and "very negative" 1 point. The average of the total points became the score of dietary attitude. Nutritional knowledge included four parts of general knowledge, food compositions, nutrients and diseases, and each part had 5 questions. A total of 20 questions were asked in the nutritional knowledge. Each question was answered with "yes", "no" or "I don't know", and 1 point was given to the right answer. The score of nutritional knowledge was presented as the number of right answers against the total of 20 points.

Life stress was investigated using modified questionnaire to measure stress levels [11], after modifying it. Stress section had 40 questions about family environment, school life, academic performance, personal reasons and circumstances. Each question was scored by the Likert 5-point scale: "very stressful" 5 points, "stressful" 4 points, "acceptable" 3 points, "a little stressful" 2 points, and "no stress" 1 point. Then, the mean of each factor and the mean of total questions were calculated.

Statistical analysis

The collected data of this study was analyzed using SPSS (Statistical Package for the Social Science) WIN 15.0 program. To find the characteristics of the subjects, frequency and percentage were calculated. Mean, standard deviation and frequency were calculated and each number was evaluated using Student t-test and χ^2 (Chi-square) to find dietary habits, dietary attitude, nutritional knowledge, life habits related to health, awareness of nutritional education and life stress in Korean girls and Chinese girls. Correlations between life stress, dietary habits, dietary attitude and nutritional knowledge were determined using Pearson's Correlation coefficient.

RESULTS

General characteristics of the subjects

The general characteristics of Korean girls and Chinese girls are shown in Table 1.

As for age, 53.8% of Korean girls and 61.7% of Chinese girls were 16. As for monthly household income, 32.6% of Korean girls' families earned 3,000,000-4,000,000 won and 30.4% of Chinese girls' families earned more than 6,000 yuan. As for fathers' academic background, the percentage of Korean girls' fathers who graduated from colleges (45.9%) was higher than the percentage of Chinese girls' fathers who graduated from colleges (42.7%), and the percentage of Chinese girls' fathers whose highest level of education was middle school (18.9%) was higher than he percentage of Korean girls' fathers whose highest level of education was middle school (5.0%). As for

Table 1. General characteristics of subjects by country N (%)

Classification		Korea	China	Total
Age (yrs)	15	20 (9.0)	14 (6.2)	34 (7.6)
	16	119 (53.8)	140 (61.7)	259 (57.8)
	17	63 (28.5)	60 (26.4)	123 (27.5)
	18	19 (8.6)	13 (5.7)	32 (7.1)
Monthly household income (10,000 won/month)	< 100 (< 1000 yuan)	2 (0.9)	2 (0.9)	4 (0.9)
	100-200 (1,000-2,000 yuan)	22 (10.0)	16 (7.0)	38 (8.5)
	200-300 (2,000-3,000 yuan)	42 (19.0)	31 (13.7)	73 (16.3)
	300-400 (3,000-4,000 yuan)	72 (32.6)	29 (12.8)	101 (22.5)
	400-500 (4,000-5,000 yuan)	40 (18.1)	45 (19.8)	85 (19.0)
	500-600 (5,000-6,000 yuan)	19 (8.6)	35 (15.4)	54 (12.1)
	600 ≤ (6,000 ≤ yuan)	24 (10.9)	69 (30.4)	93 (20.8)
Father's education level	Elementary	4 (1.8)	4 (1.8)	8 (1.8)
	Middle school	11 (5.0)	43 (18.9)	54 (12.1)
	High school	91 (41.7)	71 (31.3)	162 (36.4)
	College	100 (45.9)	97 (42.7)	197 (44.3)
	Graduate	12 (5.5)	12 (5.3)	24 (5.4)
Mother's education level	Elementary	5 (2.3)	5 (2.2)	10 (2.2)
	Middle school	7 (3.2)	49 (21.6)	56 (12.5)
	High school	133 (60.2)	88 (38.8)	221 (49.3)
	College	71 (32.1)	78 (34.4)	149 (33.3)
	Graduate	5 (2.3)	7 (3.1)	12 (2.7)
Father's occupation	Production worker/laborer	39 (17.9)	44 (19.4)	83 (18.7)
	Sales/service	27 (12.4)	9 (4.0)	36 (8.1)
	Office staff	58 (26.6)	49 (21.6)	107 (24.0)
	Administration management	11 (5.0)	39 (17.2)	50 (11.2)
	Professional	12 (5.5)	19 (8.4)	31 (7.0)
	Self employed	60 (27.5)	56 (24.7)	116 (26.1)
	Housekeeping	1 (0.5)	-	1 (0.2)
	Others	10 (4.6)	11 (4.8)	21 (4.7)
Mother's occupation	Production worker/laborer	14 (6.3)	35 (15.4)	49 (10.9)
	Sales/service	42 (19.0)	18 (7.9)	60 (13.4)
	Office staff	24 (10.9)	48 (21.1)	72 (16.1)
	Administration management	6 (2.7)	20 (8.8)	26 (5.8)
	Professional	12 (5.4)	34 (15.0)	46 (10.3)
	Self employed	33 (14.9)	37 (16.3)	70 (15.6)
	Housekeeping	77 (34.8)	24 (10.6)	101 (22.5)
	Others	13 (5.9)	11 (4.8)	24 (5.4)
	Total	221 (49.3)	227 (50.7)	448 (100.0)

mothers' academic background, the percentage of Korean girls' mothers whose highest level of education was high school (60.2%) was higher than the percentage of Korean girls' mothers whose highest level of education was high school (38.8%), and the percentage of Chinese girls' mothers whose highest level of education was middle school (21.6%) was higher than he percentage of Korean girls' mothers whose highest level of education was middle school (3.2%). As for fathers' jobs, the percentage of fathers who were self-employed was higher in the Korean girl group (27.5%) than in the Chinese girl group (24.7%), and the percentage of fathers who were administrative managers was higher in the Chinese girl group (17.2%) than in the Korean girl group (5.0%). As for mothers' jobs, the percentage of mothers who were housewives was higher in the Korean girl group (34.8%) than in the Chinese girl group (10.6%), and the percentage of mothers who were office workers was higher in the Chinese girl group (21.1%) than in the Korean girl group (10.9%).

Height, weight and BMI

The heights, weights and BMIs of Korean girls and Chinese girls are shown in Table 2.

The average height of Chinese girls (165.4 cm) was higher than Korean girls (161.3 cm) with a significant difference ($t = -8.62$, $P < .001$). As for the average weights of the two groups, Chinese group (53.1 kg) was higher than Korean girls (52.2 kg) but there was no significant difference. As for BMI, the percentage of Korean girls who were in the normal range

Table 2. Height, weight and BMI of subjects by country

Classification		Korea (n = 221)	China (n = 227)	Total (n = 448)	t or χ^2	*P*
		M ± SD	M ± SD	M ± SD		
Height (cm)		161.27 ± 5.28[1)]	165.42 ± 4.92	163.38 ± 5.50	-8.62***[2)]	0.000
Weight (kg)		52.22 ± 7.09	53.09 ± 7.84	52.66 ± 7.48	-1.23	0.219
BMI[3)] (kg/m^2)	Underweight	28 (12.7)[4)]	49 (21.6)	77 (17.2)	6.26*	0.044
	Normal	180 (81.4)	166 (73.1)	346 (77.2)		
	Overweight	13 (5.9)	12 (5.3)	25 (5.6)		
	BMI	20.08 ± 2.58	19.38 ± 2.57	19.72 ± 2.60	2.87**	0.004

[1)] Mean ± SD
[2)] By t-test, ** *P*< .01, *** *P*< .001
[3)] Underweight: < 18.5 kg/m^2, Normal: 18.5-22.9 kg/m^2, Overweight: ≥ 23 kg/m^2
[4)] N (%), by χ^2-test, * *P*< .05

Table 3. Comparison of dietary habit, dietary attitude, nutrition knowledge score of subjects by country

Classification	Korea (n = 221)	China (n = 227)	Total (n = 448)	t	*P*
	M ± SD	M ± SD	M ± SD		
Dietary habit score	3.12 ± 0.64[1)]	3.74 ± 0.78	3.43 ± 0.78	-9.31***[2)]	0.000
Dietary attitude score[3)]	2.98 ± 0.42	2.93 ± 0.48	2.96 ± 0.45	1.23	0.219
Nutritional knowledge score	17.52 ± 2.31	16.25 ± 1.90	16.88 ± 2.21	6.38***	0.000

[1)] Mean ± SD
[2)] By t-test, *** *P*< .001
[3)] Scored by a 5-point Likert scale. (1 = very negative, 2 = negative, 3 = acceptable, 4 = positive, 5 = very positive)

Table 4. Comparison of health related life style of subjects by country N (%)

Classification		Korea	China	Total	χ^2	*P*
Sleeping time (hrs/day)	< 4	6 (2.7)	6 (2.6)	12 (2.7)	6.02	0.111
	4 - 6	92 (41.6)	70 (30.8)	162 (36.2)		
	6 - 8	112 (50.7)	140 (61.7)	252 (56.3)		
	8 ≤	11 (5.0)	11 (4.8)	22 (4.9)		
Frequency of exercise (time/wk)	Every day	11 (5.0)	44 (19.4)	55 (12.3)	63.53***[1)]	0.000
	5 - 6	12 (5.4)	23 (10.1)	35 (7.8)		
	3 - 4	27 (12.2)	58 (25.6)	85 (19.0)		
	1 - 2	73 (33.0)	66 (29.1)	139 (31.0)		
	Never	98 (44.3)	36 (15.9)	134 (29.9)		
Watching TV (hrs/day)	< 1	60 (27.1)	197 (86.8)	257 (57.4)	164.38***	0.000
	1 - 2	76 (34.4)	17 (7.5)	93 (20.8)		
	2 - 3	56 (25.3)	8 (3.5)	64 (14.3)		
	3 - 4	21 (9.5)	2 (0.9)	23 (5.1)		
	4 ≤	8 (3.6)	3 (1.3)	11 (2.5)		
Using PC (hrs/day)	< 1	57 (25.8)	179 (78.9)	236 (52.7)	127.48***	0.000
	1 - 2	74 (33.5)	26 (11.5)	100 (22.3)		
	2 - 3	46 (20.8)	10 (4.4)	56 (12.5)		
	3 - 4	22 (10.0)	6 (2.6)	28 (6.3)		
	4 ≤	22 (10.0)	6 (2.6)	28 (6.3)		
Total		221 (49.3)	227 (50.7)	448 (100.0)		

[1)] By χ^2 - test, *** *P*< .001

(81.4%) was higher than Chinese girls (73.1%), and the there were more Chinese girls (21.6%) than Korean girls (12.7%) in the underweight range ($\chi^2 = 6.26$, $P < .005$).

Dietary habits, dietary attitude and nutritional knowledge

Dietary habits, dietary attitude and nutritional knowledge of Korean girls and Chinese girls are shown in Table 3.

As a whole, Chinese girls' dietary habits score were higher than Korean girls' and there was a statistically significant difference (t = -9.31, $P < .001$). As for dietary attitude, Korean girls were more positive than Chinese girls, but there was no statistically significant difference. As for nutritional knowledge, Korean girls were more advanced than Chinese girls with a significant difference (t = 6.38, $P < .001$).

Health related life style and awareness of nutritional education

The comparison of health related life style of subjects by country in Korean girls and Chinese girls were shown in Table 4.

Table 5. Comparison of nutrition information sources and the need for nutrition education by country N (%)

Classification		Korea	China	Total	χ^2 or t	*P*
Sources of nutrition information	Lesson	50 (22.6)[1)]	15 (6.6)	65 (14.5)	62.34***	0.000
	Parents	33 (14.9)	41 (18.1)	74 (16.5)		
	TV, radio	50 (22.6)	57 (25.1)	107 (23.9)		
	Internet, PC	65 (29.4)	42 (18.5)	107 (23.9)		
	Doctor, dietitian	8 (3.6)	12 (5.3)	20 (4.5)		
	Friends	2 (0.9)	16 (7.0)	18 (4.0)		
	Newspaper, magazine	5 (2.3)	38 (16.7)	43 (9.6)		
	Others	8 (3.6)	6 (2.6)	14 (3.1)		
Degree of trust and practice for nutrition information		3.19 (0.71)	3.34 (0.58)	3.27 (0.65)	-2.43*[2)]	0.015
Degree of need for nutrition education		3.48 (0.93)	3.76 (0.86)	3.62 (0.91)	-3.39**	0.001
Total		221 (49.3)	227 (50.7)	448 (100.0)		

[1)] N (%), by χ^2 - test, *** $P < .001$
[2)] By t-test, * $P < .05$, ** $P < .01$

Table 6. Comparison of life stress score of subjects by country

Classification	Korea (n = 221)	China (n = 227)	Total (n = 448)	t	*P*
	M ± SD	M ± SD	M ± SD		
Home environment factors	2.44 ± 0.66[1)2)]	2.31 ± 0.72	2.37 ± 0.69	1.86	0.063
School life factors	2.36 ± 0.74	2.70 ± 0.81	2.54 ± 0.79	-4.69***[3)]	0.000
Academic factors	3.42 ± 0.82	3.36 ± 0.90	3.39 ± 0.86	0.80	0.424
Personal factors	2.71 ± 0.64	2.75 ± 0.77	2.73 ± 0.71	-0.55	0.581
Surrounding environment factors	2.66 ± 0.67	2.27 ± 0.71	2.46 ± 0.71	5.99***	0.000
Total stress score	2.68 ± 0.54	2.64 ± 0.61	2.66 ± 0.57	0.80	0.422

[1)] Scored by a 5-point Likert scale. (1 = no stress, 2 = a little stressful, 3 = acceptable, 4 = stressful, 5 = very stressful)
[2)] Mean ± SD.
[3)] By t-test, *** $P < .001$

As for daily average hours of sleep, more Korean girls answered 4-6 hours compared to Chinese girls and more Chinese girls answered 6-8 hours than Korean girls, but there was no significant difference. About regular exercise, Korean girls did not exercise compared to Chinese girls, and the percentage of Chinese girls who exercise regularly was higher than the percentage of Korean girls with a significant difference ($\chi^2 = 63.53$, $P < .001$).

As for the hours of watching TV, while the majority of Korean girls answered 1-2 hours, the majority of Chinese girls (86.8%) answered less than 1 hour. There was a significant difference in the hours of watching TV between countries ($\chi^2 = 164.38$, $P < .001$). As for the average hours of playing games and using computers, while the majority of Korean girls (33.5%) answered 1-2 hours, the majority of Chinese girls (78.9%) answered less than 1 hour. There was a significant difference ($\chi^2 = 127.48$, $P < .001$).

Comparison of nutrition information sources and the need for nutrition education in Korean girls and Chinese girls are shown in Table 5.

As for nutritional knowledge and the source of nutrition information, while Korean girls learned the information through the Internet and PCs, Chinese girls learned through TV and radio. Also, there was a statistically significant difference between the two groups ($\chi^2 = 62.34$, $P < .001$). The degree of trust and practice for nutrition information in Chinese girls was higher than Korean girls, and there was a significant difference between the two groups (t = -2.43, $P < .05$). As for degree of need for nutrition education in Chinese girls was higher than Korean girls with a significant difference (t = -3.39, $P < .01$).

Life stress

Comparison of life stress score in Korean girls and Chinese girls is shown in Table 6.

Life stress scores in Korean girls and Chinese girls were 2.68 and 2.64, respectively, against the total of 5 points. There was no significant difference. In both groups, academic performance was the most stressful factor. Personal reasons and circumstances followed academic performance in the Korean girl group, and in the Chinese girl group, personal reasons and school life were the second and third stressful factors.

Taken by stress factor, the score of family environment factor was higher in Korean girls than in Chinese girls but there was no significant difference. As for the school life factor, Chinese girls were more stressed out than Korean girls with a significant difference (t = -4.69, $P < .001$). As for academic performance, Korean girls were more stressed out than Chinese girls, but there was no significant difference. About personal reasons, the score of Chinese girls was higher than Korean girls, but there was no significant difference. The score of circumstances was higher in the Korean girl group than in the Chinese girl group with a significant difference (t = 5.99, $P < .001$). In general, with regards to life stress, Korean girls were more stressed out than Chinese girls, but there was no significant difference.

Table 7. Correlation coefficients between dietary habits, dietary attitude, nutritional knowledge, snack intake and life stress by country

Classification		Life stress
Korea	Dietary habits	-0.197 (0.003)**[1)]
China		-0.304 (0.000)***
Korea	Dietary attitude	-0.099 (0.143)
China		-0.162 (0.014)*
Korea	Nutritional knowledge	-0.145 (0.031)*
China		-0.119 (0.074)
Korea	Snack intake	0.186 (0.006)**
China		0.153 (0.021)*

[1)] * $P<.05$, ** $P<.01$, *** $P<.001$

Correlations between dietary habits, dietary attitude, nutritional knowledge and life stress

Correlations between dietary habits, dietary attitude, nutritional knowledge and life stress in Korean female students and Chinese female students are shown in Table 7.

Dietary habits had a significantly negative correlation with life stress in both the Korean girl group and Chinese girl group ($r=-.197$, $P<.01$, $r=-.304$, $P<.001$). Dietary attitude did not have a significant correlation with life stress in the Korean girl group, but they had a significantly negative correlation with life stress in the Chinese girl group ($r=-.162$, $P<.05$). Nutritional knowledge had a significantly negative correlation with life stress in Korean girls ($r=-.145$, $P<.05$), but there was no significant correlation in Chinese girls. Snack intake had a significantly positive correlation with life stress in Korean girl group and Chinese girl group ($r=.186$, $P<.01$, $r=.153$, $P<.05$).

DISCUSSION

This study investigated dietary habits, dietary attitude, nutritional knowledge, health related life style and life stress of Korean and Chinese female high school students and compared all the results. Height and weight of subjects in both countries were comparable to national average height and weight of both countries, respectively.

Chinese girls had better dietary habits and as for dietary attitude, there was no significant difference between the two countries. In a study which compared the diet of Korean college students and the diet of Chinese college students [7], Chinese students were better in the regularity of eating, the rate of eating breakfast and parents' diet guides, showing similar results to the results of this study. The rate of eating breakfast, which is an important nutritional issue for adolescents, is higher in Chinese adolescents than in Korean adolescents [12,13]. In this study, nutritional knowledge was higher in Korean girls than Chinese girls. Nutritional knowledge is an important factor for diet. Even though Korean girls had more knowledge about nutrition than Chinese girls had, the rate of applying the knowledge to a real diet was very low, which means practical and specific nutritional education is needed to link knowledge to a real diet.

As for the daily average number of hours sleep, both Korean girls and Chinese girls answered 6-8 hours most, and there was no difference between the two countries. With regard to regular exercise, the rate of Chinese girls who frequently do regular exercise was higher than Korean girls. This is similar to the result in the Korean survey on the healthy status of youth and children by the National Youth Policy Institute which says the rate of Korean female high school students who do physical activities 5 times or more a week was 6.4% and Chinese female high school students 13.2% [14]. In this study, Korean female high school students spent more time watching TV and using PCs compared to Chinese girls. This trend is shown in a study on the comparison of learning mentality and status between high school students in China, Japan, Korea and the United States, in which the PC use rates of Korean students and Chinese students are 91.0%, 39.3%, respectively. Leisure activities of female middle school students in big cities in China are playing computer games (16.8%), watching TV/DVD (17.9%) or playing sports (9.2%) [16]. However, Korean youth spend spare time on weekends or holidays watching TV/DVD (61.6%) or playing computer games (49.6%), according to Statistics Korea [17]. This is in line with the results of this study. As Korean girls do less exercise and spend more time watching TV and using PCs than Chinese girls, efforts to improve physical exercise are needed in Korean students.

With regard to sources for information on nutrition, Korean girls get the information from the Internet or PCs most, but Chinese girls learn the information from TV or radio most. This is different from the result in 2006, when TV and radio were the youth's main sources to get nutrition information [18]. Compared to Chinese girls, more Korean girls get nutritional knowledge through school learning (22.6%). However, previous studies on female middle school students [19] and female high school students [20] found higher rates of students who get nutritional knowledge through school learning as 47.0% and 35.6% respectively. In short, the result of this study is higher compared to Chinese girls but lower than the previous studies. In Korea, a system to verify nutrition information is not yet established and female students can accept information on the Internet indiscriminately, so schools should enhance nutritional education. Chinese girls' confidence in learned nutrition information and performance was found to be higher than Korean girls, and awareness of the need for nutritional education was higher in Chinese girls than in Korean girls. This explains Table 3, which shows that Chinese girls' nutritional knowledge was lower than Korean girls but Chinese girls' dietary habit were better than Korean girls'.

As for stress, there was no significant difference between the two countries re total points. However, while Korean girls were more vulnerable to circumstances than Chinese girls, Chinese girls were more vulnerable to school life than Korean girls. Academic performance was the most stressful factor for both groups. Personal reasons and circumstances followed academic performance factor in Korean girls, and personal reasons and school life followed academic performance in Chinese girls. Stress factors in Korean adolescents are various including family problems such as family conflict, school life problems such as excessive studying and poor academic performance, peer relationships such as dating, and problems related to themselves [21]. The result of this study is similar to a report that school life and academic performance are the most stressful factors

in high school students [22] and a report that 87.8% of Korean adolescents were stressed out for 1 year and among them, 72.6% were stressed out because of academic performance [23], but is different from a report that looks and appearance is the most stressful factor [24]. The reason why both groups answered academic performance as the most stressful factor, is that Korea and China have an educational system focusing on entering colleges so students in both countries are suffering from pressure to attain good scores to enter colleges [25]. Among Korean, Chinese, American and Japanese students, Chinese students were stressed out most, according to a survey on stress levels of students in the four countries [26].

With regard to relations between dietary habits and life stress, there was a negative correlation between them in both groups, which means as life stress is less, diet habits are better. In the Chinese girl group, as life stress was less, dietary attitude was more positive, and in the Korean girl group, as life stress was less, nutritional knowledge was higher. The result of this study that stress has a negative influence on dietary habits, was already found in previous studies [27-29]. In adults, as dietary habit score was higher, stress level was lower [27]. A study on female high school students found that as stress and depression level was higher, eating frequency and eating times were more irregular, and higher level of depression caused higher stress level and more binge eating [28]. Among high school students in Seoul, when they ate meals slowly and had a good appetite, stress levels were low [29]. A dietary habit can be a factor which determines individual's nutritional status and health. Thus, that a dietary habit is influenced by psychological problems such as stress, can be translated as students under stress cannot have a good nutritional status [30]. Body weight perception of female Korean students was more seriouly distorted than that of Chinese students [31]. Proper nutritional education programs that promote physical exercise and psychological well-being by reducing stress were needed.

In summary, Korean girls had more nutritional knowledge than Chinese girls but their dietary habits were unhealthy. Korean girls spend less time working out and more time watching TV and using PCs than Chinese girls. Also, Korean girls' trust and practice for nutrtion information were low and the need for nutritional education was low as well. Both Korean and Chinese girls were stressed out mostly because of academic performance and there was a negative correlation between life stress and diet habits. As life stress was less, diet habits were better. Therefore, proper nutritional education programs that apply learned nutrition information to real life and promote physical exercise and psychological well-being by reducing stress are needed.

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