

# Chapter 44

## Correlations Between Dietary Taurine Intake and Life Stress in Korean College Students

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**Abstract** The purpose of this study was to investigate the relationship between dietary taurine intake and life stress in Korean college students. The subjects were 320 college students (164 male and 156 female). A three day-recall method was used to assess dietary status (2 weekdays and 1 weekend). Life stress scores were determined using a self-administered life stress questionnaire. The higher stress scores indicate a high frequency and importance of the stress. Average dietary intake of taurine in male and female subjects was  $124.1 \pm 78.8$  mg/day and  $96.9 \pm 71.7$  mg/day, respectively. There were significant negative correlations between taurine intake and the frequency ( $p < 0.01$ ), importance ( $p < 0.05$ ) and total scores ( $p < 0.05$ ) of life stress in female subjects while there were no significant correlations between taurine intake and the frequency, importance and total scores of life stress in male subjects. In female subjects a correlation existed between taurine intake and professor problems, friend problems and future problems ( $p < 0.05$ ). These results suggest that dietary taurine intake may play an important role in reducing life stress.

### 44.1 Introduction

Dietary intake of taurine may play an important role in physical and psychological well-being. But standard dietary references often exclude data on taurine content of common foods (Stapleton et al. 1997). The largest amounts of taurine are present in meat and fish. Taurine is also detected in the plant kingdom, including cereals, potatoes, pulses nuts, seeds, vegetables and fruits, but the levels are much lower than those found in meat and fish (Park et al. 1998). Stress has both direct and indirect adverse effects on health, often leading to general diseases. A solution containing taurine, vitamin B<sub>2</sub>, vitamin B<sub>6</sub> and caffeine increased the locomotor activity following exposure to REM sleep deprivation and immobilization stress in mice (Tadano et al. 2003). It has also been reported that taurine supplementation alleviates visual fatigue induced by VDT (visual display terminals) and work (Zhang et al. 2004). However, little information is available on the relationship between dietary taurine

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intake and the degree of life stress. Therefore the purpose of this study was to investigate the relationship between dietary taurine intake and the level of life stress among Korean college students.

## 44.2 Methods

### 44.2.1 Subjects

The subjects were 320 college students (164 male and 156 female) residing in the Seoul and Incheon areas and attending a non-major nutritional education class via the internet. A cross-sectional study was carried out using a self-administered questionnaire.

### 44.2.2 Dietary Taurine Assessment

The three day-recall method was used to assess dietary status (2 weekdays and 1 weekend). Dietary taurine intake was estimated using the computer-aided nutrition program (CAN-pro 3.0 The Korean Nutrition Society Korea). The program contained a taurine content database for 17 food groups commonly used in 310 food items (Kim et al. 1999; Park 1999, 2000).

### 44.2.3 Life Stress Scale

Subjects responded to each life stress event for one year using a self-administered life stress questionnaire containing fifty questions about the frequency and importance of the stress and was evaluated using a 4 point rating scale of 0 to 3 (Chon 2000). The life stress scale for college students was constructed using eight life stress areas: (interpersonal relationships for faculty, lover, friend and family) (task-related stress; grade future economy value). The total life stress score was calculated by multiplying the frequency and importance of the stress. The greater the stress scores, the greater the frequency and importance of the stress. Previously we reported a life stress level (Table 44.1) and score of life stress (Table 44.2) of the some subjects (Sung and Chang 2006). In this study we used the data from the same subjects.

**Table 44.1** Life stress level of Korean college students

|                            | Male ( <i>n</i> = 164) | Female ( <i>n</i> = 156) |
|----------------------------|------------------------|--------------------------|
| Experience frequency**     | 35.5 ± 17.1            | 41.9 ± 17.9              |
| Importance**               | 41.5 ± 20.1            | 49.4 ± 21.0              |
| Total life stress scores** | 68.3 ± 44.8            | 86.2 ± 49.2              |

Values represent means ± SD. Asterisks denote significant differences between groups \*\**p* < 0.01 by Student's t-test.

**Table 44.2** Life stress level by life stress category

|                                   | Male (n = 164) | Female (n = 156) |
|-----------------------------------|----------------|------------------|
| Interpersonal relationship stress |                |                  |
| Faculty problem                   | 8.1 ± 11.6     | 10.0 ± 10.7      |
| Lover problem                     | 6.1 ± 13.7     | 7.8 ± 15.3       |
| Friend problem*                   | 2.7 ± 7.3      | 4.4 ± 8.4        |
| Family problem***                 | 4.5 ± 7.4      | 9.1 ± 13.2       |
| Task-related stress               |                |                  |
| Grade problem**                   | 25.0 ± 19.8    | 32.8 ± 21.6      |
| Future problem*                   | 29.4 ± 23.1    | 34.7 ± 23.5      |
| Economy problem                   | 16.8 ± 18.7    | 16.9 ± 20.1      |
| Value problem**                   | 20.5 ± 19.9    | 28.7 ± 23.8      |

Values represent means ± SD. Asterisks denote significant differences between groups \* $p < 0.05$  \*\* $p < 0.01$  \*\*\* $p < 0.001$  by Student's t-test.

#### 44.2.4 Statistical Analysis

The statistical analysis was conducted using the SPSS 12.0 program. Mean and standard deviations were calculated for all variables and analyzed by analysis of the Student's t-test. The correlation between life stress and dietary taurine intake were analyzed using Pearson's correlation coefficient.

### 44.3 Results and Discussion

#### 44.3.1 Anthropometric Data

Anthropometric data of the subjects are shown in Table 44.3. The average age was  $23.7 \pm 2.5$  years and  $20.9 \pm 1.5$  years in male and female subjects, respectively.

#### 44.3.2 Intake of Energy, Major Nutrients and Taurine

The average dietary intake of taurine is shown in Table 44.4, along with data on the intake of energy and major nutrients. The intake of energy in the male and female subjects was  $1950.6 \pm 472.9$  kcal/day and  $1495.5 \pm 374.6$  kcal/day, respec-

**Table 44.3** Age and anthropometric data of the subjects

|                          | Male (n = 164) | Female (n = 156) |
|--------------------------|----------------|------------------|
| Age (years)              | 23.7±2.5       | 20.9±1.5         |
| Height (cm)              | 174.9±5.3      | 161.7±4.5        |
| Weight (kg)              | 73.3±11.6      | 55.5±7.6         |
| BMI (kg/m <sup>2</sup> ) | 23.9±3.4       | 21.4±3.0         |

Values represent means ± SD.

**Table 44.4** Intake of energy, major nutrients and taurine among the subjects

|                             | Male ( <i>n</i> = 164) | Female ( <i>n</i> = 156) |
|-----------------------------|------------------------|--------------------------|
| Energy intake (kcal/day)    | 1950.6±472.9           | 1495.5±374.6             |
| Protein intake (g/day)      | 74.3±24.6              | 56.1±19.8                |
| Lipid intake (g/day)        | 61.8±28.0              | 47.1±21.0                |
| Carbohydrate intake (g/day) | 246.8±59.1             | 206.3±51.8               |
| Taurine intake (mg/day)     | 124.1±78.8             | 96.9±71.7                |

Values represent means ± SD.

tively. The average intake of energy and protein of the male subjects was 75.0% and 135.1% and that of the female students was 71.2% and 124.7% of Korean dietary reference intake (%KDRIs), respectively. The average dietary intake of taurine among the male and female subjects was  $124.1 \pm 78.8$  mg/day (range from 8.0 to 370.9 mg/day) and  $96.9 \pm 71.7$  mg/day (range from 1.9 to 287.71 mg/day), respectively. There was a significant difference between male and female subjects relative to dietary taurine intake ( $p < 0.01$ ).

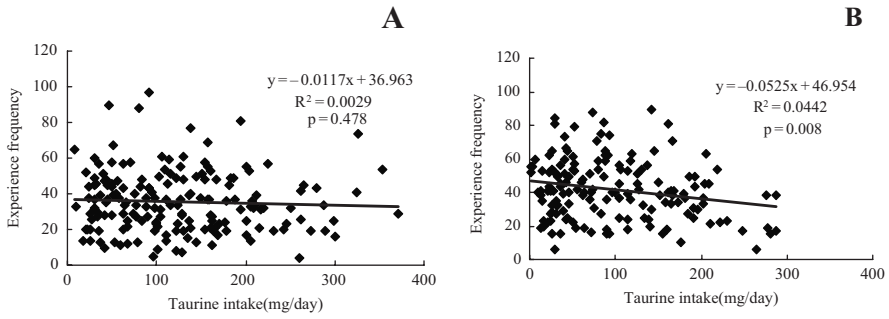
The daily taurine intake based on the food recording method with a database on taurine (Park 1999) was  $185 \pm 19.1$  mg per person (20–29 years) in the Seoul area. The daily taurine intake was  $114.9 \pm 78.7$  mg for women (34–54 years) living on Jeju Island in Korea (Kim et al. 2003). Also dietary taurine intake of Japanese adults (20–59 years) was  $222.5 \pm 210.3$  mg/day for males and  $162.2 \pm 144.1$  mg/day for females (Kibayashi et al. 2000).

#### ***44.3.3 Correlation Between Dietary Taurine Intake and the Level of Life Stress***

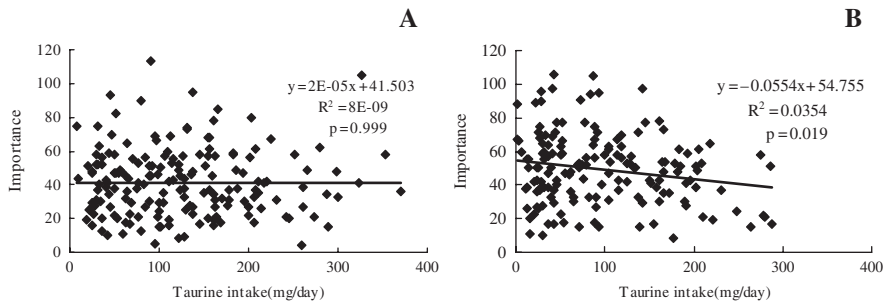
The correlation between dietary taurine intake and the level of life stress is shown in Figs. 44.1, 44.2, 44.3. There was a difference between male and female subjects relative to the correlation between taurine intake and life stress level. There were negative correlations between taurine intake and the frequency of stress ( $p < 0.01$ ), the importance of the stress ( $p < 0.05$ ) and total scores of life stress ( $p < 0.05$ ) in female subjects while there were no significant correlations between taurine intake and those stress parameters in the male subjects.

#### ***44.3.4 Correlation Between Dietary Taurine Intake and the Level of Life Stress***

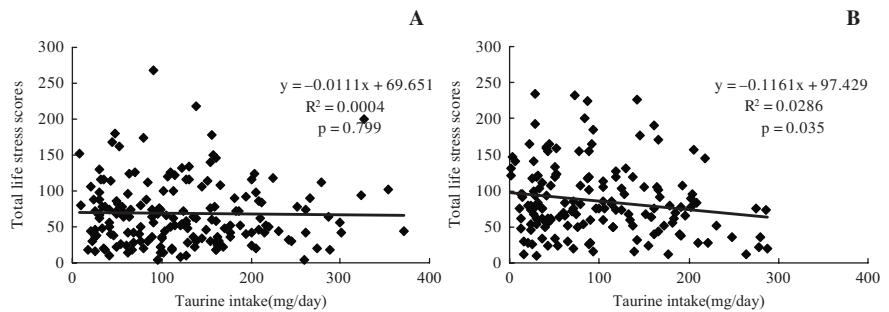
The correlation between dietary taurine intake and life stress is shown in Table 44.5. In female subjects correlations between dietary taurine intake and faculty problems, friend problems and future problems exhibited a significant negative correlation ( $p < 0.05$ ). In male subjects there was no significant correlation between dietary taurine intake and life stress.



**Fig. 44.1** Effect of sex on the correlation between dietary taurine intake and the frequency of stress. **A.** Male, **B.** Female



**Fig. 44.2** Effect of sex on the correlation between dietary taurine intake and the importance of stress. **A.** Male, **B.** Female



**Fig. 44.3** Effect of sex on the correlation between dietary taurine intake and total life stress scores. **A.** Male, **B.** Female

**Table 44.5** Correlation between dietary taurine intake and life stress category

|                 | Taurine intake (mg/day) |                          |
|-----------------|-------------------------|--------------------------|
|                 | Male ( <i>n</i> = 164)  | Female ( <i>n</i> = 156) |
| Faculty problem | 0.040                   | -0.160*                  |
| Lover problem   | 0.046                   | 0.045                    |
| Friend problem  | -0.020                  | -0.222**                 |
| Family problem  | 0.018                   | -0.098                   |
| Grade problem   | -0.055                  | -0.063                   |
| Future problem  | 0.003                   | -0.177*                  |
| Economy problem | -0.100                  | -0.060                   |
| Value problem   | 0.046                   | -0.143                   |

\*, \*\* Significant correlations were assessed by the Pearson correlation, with significance being expressed as  $p < 0.05$  and  $p < 0.01$ .

## 44.4 Conclusion

There was a difference between male and female subjects relative to the correlation between dietary taurine intake and life stress. Our results show a negative correlation between dietary taurine intake and life stress in female subjects. These results suggest that dietary taurine intake reduces the level of life stress. Therefore, further study is warranted examining the effect of seafood, which is rich in taurine, on stress.

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