

# Consumers of Dietary Supplements: Gender and Immigrant Status Differences Among College Students

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## Citation

J Fogel, N Kholodenko. *Consumers of Dietary Supplements: Gender and Immigrant Status Differences Among College Students*. The Internet Journal of Alternative Medicine. 2004 Volume 3 Number 1.

## Abstract

Dietary supplements are increasingly used to manage weight. The primary objective of this study was to examine whether there are gender differences with regard to this use. The secondary objective was to examine whether this was influenced by immigrant status. We conducted analysis of variance and also analysis of covariance for two additional models adjusting for the relevant covariates, where we compared men and women with regard to items regarding use of dietary supplements (n=150). We also stratified for both immigrant and non-immigrant status and conducted similar analyses. Overall, 47.3% of the students surveyed used dietary supplements to lose weight. Men were more likely than women to believe that dietary supplements were a good way to lose weight ( $p<.05$ ). These significant results were maintained in the stratified analyses for non-immigrants but not immigrants. Men and more specifically non-immigrant men view dietary supplement use as a good way to lose weight.

## INTRODUCTION

Physical appearance is a major issue among society today. On one hand, obesity has increased from 12% to 19.8% in the last 10 years (1). On the other hand, the media has convinced millions of women in the United States that what is considered normal body weight by medical standards is no longer normal; in fact, it is abnormal and a cause for severe dieting (2). In one survey of 272 college students, among the 27 students who took dietary supplements to promote weight loss, almost 20% had an abnormal body mass index (BMI) (3). Individuals go to extreme measures through pills, diet, and exercise to achieve the goal of a perfect body. According to the National Association of Anorexia Nervosa and Associated Disorders, approximately 8 million females and 1 million males suffer from eating disorders (4).

Healthy weight is important. In the United States in 2004, estimates of BMI show that 54% of adults, 12% of adolescents, and 14% of children are overweight. Also, 35% of United States undergraduate college students are overweight (5). College students gain approximately 2 kilograms in their freshman year alone (6).

Psychological beliefs and attitudes are interrelated with weight loss. In one study (7), losing weight caused an immediate effect of improved self-representation, specifically in terms of thoughts about exercise and appearance, for both men and women. Not all beliefs and

attitudes are similar among men and women. Among college students in the United States, 60% of men were overweight, but over 30% did not see themselves as such (8). In general, only some men are dissatisfied with their physical appearance (9). With regard to women, one study showed that most students trying to lose weight were women and also that they were less likely than men to be overweight (5). Women have a higher preoccupation with their self-image and appearance than men do. In one study (n=324), women showed a 38% occurrence of dieting behavior as compared to men who only had a 15% occurrence (10).

There are many techniques to lose weight. Among the most popular are through dietary changes, exercise, and the use of non-prescription pills. According to Liebman, Cameron, & Carson (10), women rely on dieting to a greater extent than men. Physical activity and a healthy diet are connected. Often women and men use both exercise and diet to obtain weight loss results (5). Non-prescription pills are another popular alternative. One population-based sample of 14,679 adults greater than 18 years old showed that 18% of women and 8% of men reported the use of non-prescription weight-loss products to lose weight (11).

The primary objective of this study is whether among college students there are gender differences with regard to the use of dietary supplements to lose weight. Due to the greater concerns about weight loss among women, we

hypothesize that they will be more likely to use dietary supplements. The secondary objective is to explore whether among college students there are differences between those born in the United States and those that are immigrants with regard to the use of dietary supplements to lose weight.

## METHOD

### PARTICIPANTS AND PROCEDURES

Participants were 150 students from Brooklyn College of the City University of New York, a four-year undergraduate degree-granting institution. Participants included those of different ages, race/ethnicities, and weights. Participation was 100% voluntary and the sampling method was a convenience sample. Participants completed a questionnaire on topics related to dietary supplement use, along with demographic questions. Data collection occurred during March 2005.

## MEASURES

### DEMOGRAPHICS

Demographic variables included age, gender, race/ethnicity, and whether they were born in the United States.

### SELF-PERCEIVED WEIGHT STATUS

Participants were asked to choose whether they were of regular weight, less than 10 pounds overweight, between 10 to 20 pounds overweight or greater than 20 pounds overweight.

### DIETARY SUPPLEMENT USE

Participants were asked to respond either yes or no to whether they used dietary supplements to lose weight. Participants also responded using a 5-point Likert-style scale ranging from strongly disagree = 1 to strongly agree = 5 to three items inquiring about dietary supplement use. These items were, "Dietary supplements are a good way to lose weight," "I sometimes consider taking weight loss supplements," and "There are potentially harmful consequences with using diet supplements."

## STATISTICAL ANALYSIS

The independent variable was gender and the dependent variables the three items regarding use of dietary supplements. We used analysis of variance (ANOVA) and also analysis of covariance (ANCOVA) for two additional models adjusting for the relevant covariates, where we separately compared men and women with regard to the three items regarding their use of dietary supplements. In one ANCOVA model covariates included age, race/ethnicity

(dummy coded, reference category =white), weight (dummy coded, reference category = regular weight), and alternative supplement use. In the other ANCOVA model, these covariates plus immigrant status were included. We also stratified for both immigrant and non-immigrant status and conducted ANOVA and the first ANCOVA model. All analyses were done with SPSS (Version 12.0). The p level was considered significant at < 0.05.

## RESULTS

The demographic variables are shown in Table 1. Men and women had similar mean ages of 22 years. The race/ethnicity of the individuals was varied, with almost half being white. More than half were immigrants and not born in the United States. Almost 60% were of regular weight. Almost 50% used dietary supplements in order to lose weight. Table 2 shows that among women and men who have used dietary supplements to lose weight, 52.1% were non-immigrants.

**Figure 1**

Table 1: Sample Characteristics and Demographics of Dietary Supplement Use Among 150 College Students

| Variable/Categories    | Women<br>n (%) | Men<br>n (%) | Total Subjects<br>N (%) |
|------------------------|----------------|--------------|-------------------------|
| Age [Mean (SD)]        | 22.41 (4.79)   | 22.31(3.36)  | 22.37(4.20)             |
| Gender                 |                |              |                         |
| Woman                  | 83 (55.3)      |              | 150 (100)               |
| Men                    |                | 67 (44.7)    |                         |
| Born in United States  |                |              |                         |
| Yes                    | 39 (47.0)      | 32 (47.8)    | 71 (47.3)               |
| No                     | 44 (53.0)      | 35 (52.2)    | 79 (52.7)               |
| Race/Ethnicity         |                |              |                         |
| White                  | 39 (47.0)      | 27 (40.3)    | 66 (44.0)               |
| African-American       | 11 (13.3)      | 9 (13.4)     | 20 (13.3)               |
| Hispanic               | 7 (8.4)        | 5 (7.5)      | 12 (8.0)                |
| Asian-American         | 7 (8.4)        | 9 (13.4)     | 16 (10.7)               |
| South-Asian            | 9 (10.8)       | 5 (7.5)      | 14 (9.3)                |
| Other                  | 10 (12.0)      | 12 (17.9)    | 22 (14.7)               |
| Weight                 |                |              |                         |
| Regular weight         | 48 (57.8)      | 38 (56.7)    | 86 (57.3)               |
| < 10 lbs overweight    | 9 (10.8)       | 6 (9.0)      | 15 (10.0)               |
| 10 – 20 lbs overweight | 17 (20.5)      | 10 (14.9)    | 27 (18.0)               |
| > 20 lbs overweight    | 9 (10.8)       | 13 (19.4)    | 22 (14.7)               |
| Dietary Supplement Use |                |              |                         |
| Yes                    | 40 (48.2)      | 31 (46.3)    | 71 (47.3)               |
| No                     | 42 (50.6)      | 36 (53.7)    | 78 (52.0)               |
| Missing                | 1 (1.2)        | ---          | 1 (0.7)                 |

Note: M = Mean, SD = Standard Deviation

**Figure 2**

Table 2: Use of Alternative Supplements Among Immigrants and Non-Immigrants

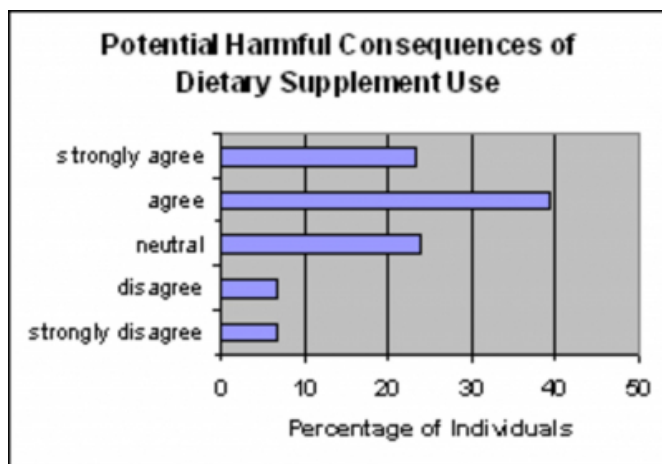
|               | Women<br>N (%) | Men<br>N (%) | Total<br>N (%) |
|---------------|----------------|--------------|----------------|
| Immigrant     | 22(55.0)       | 15(48.4)     | 34 (47.9)      |
| Non-Immigrant | 18 (45.0)      | 16 (51.6)    | 37 (52.1)      |

Table 3 shows ANOVA and ANCOVA analyses for

analyses of dietary supplement use by gender. Contrary to our hypothesis, men had higher mean scores than women regarding the item inquiring about whether dietary supplements are a good way to lose weight. These results were maintained in both ANCOVA models. No significant differences were found between men and women regarding the item inquiring about considering taking dietary supplements or associating dietary supplement use with potentially harmful consequences.

**Figure 3**

Figure 1: Shows the overall percentages for individuals regarding the potential harmful consequences of dietary supplement use. Fortunately, only a small percentage indicated that they strongly disagreed or disagreed with that statement.



**Figure 4**

Table 3: Analyses of Dietary Supplement Use by Gender Among 150 College Students

| Item  | Men Mean (SD) (n = 67) | Women Mean (SD) (n = 83) | Model 1 Univariate F Statistic | Model 2 Multivariate F Statistic (a) | Model 3 Multivariate F Statistic (b) |
|---|------------------------|--------------------------|--------------------------------|--------------------------------------|--------------------------------------|
| Dietary supplements are a good way to lose weight.                      | 2.84 (1.07)            | 2.40 (1.12)              | 5.95*                          | 6.72*                                | 6.65*                                |
| I sometimes consider taking weight loss supplements.                    | 2.45 (1.36)            | 2.27 (1.37)              | 0.66                           | 0.37                                 | 0.36                                 |
| There are potentially harmful consequences with using diet supplements. | 3.63 (1.11)            | 3.69 (1.12)              | 0.11                           | 0.27                                 | 0.28                                 |

Note: (a) Covariates include age, race/ethnicity (dummy coded), weight (dummy coded), and alternative supplement use.  
(b) Covariates include all in Model 2 plus immigrant status.  
\* p = < 0.05

Table 4 shows ANOVA and ANCOVA analyses of dietary supplement use by gender stratifying for non-immigrants. Men had higher mean scores than women, regarding dietary supplement use as a good way to lose weight and regarding considering taking weight loss supplements. Table 5 shows ANOVA and ANCOVA analyses of dietary supplement use by gender stratifying for immigrants. There were no

significant differences between men and women.

**Figure 5**

Table 4: Analyses of Dietary Supplement Use by Gender Stratifying for Non-Immigrants among 150 College Students

| Item  | Men Mean (SD) (n = 67) | Women Mean (SD) (n = 83) | Model 1 Univariate F Statistic | Model 2 Multivariate F Statistic (a) |
|---|------------------------|--------------------------|--------------------------------|--------------------------------------|
| Dietary supplements are a good way to lose weight.                      | 3.03 (0.86)            | 2.50 (1.13)              | 5.42*                          | 6.20*                                |
| I sometimes consider taking weight loss supplements.                    | 2.91 (1.25)            | 2.26 (1.43)              | 4.41*                          | 5.19*                                |
| There are potentially harmful consequences with using diet supplements. | 3.59 (0.91)            | 3.84 (1.00)              | 1.23                           | 1.00                                 |

Note: (a) Covariates include age, race/ethnicity (dummy coded), weight (dummy coded), alternative supplement use.  
\* p = < 0.05

**Figure 6**

Table 5: Analyses of Dietary Supplement use by Gender Stratifying for Immigrants Among 150 College Students

| Item  | Men Mean (SD) (n = 67) | Women Mean (SD) (n = 83) | Model 1 Univariate F Statistic | Model 2 Multivariate F Statistic (a) |
|---|------------------------|--------------------------|--------------------------------|--------------------------------------|
| Dietary supplements are a good way to lose weight.                      | 2.66 (1.21)            | 2.34 (1.10)              | 1.48                           | 1.44                                 |
| I sometimes consider taking weight loss supplements.                    | 2.03 (1.34)            | 2.30 (1.34)              | 0.77                           | 1.33                                 |
| There are potentially harmful consequences with using diet supplements. | 3.66 (1.28)            | 3.55 (1.21)              | 0.16                           | 0.001                                |

Note: (a) Covariates include age, race/ethnicity (dummy coded), weight (dummy coded), alternative supplement use.  
\* p = < 0.05

## DISCUSSION

This study consisted of male and female students of varied weight and ethnic backgrounds, including those who are immigrants and from an urban, inner-city, population. Our results show that men are more likely than women to believe that dietary supplements are a good way to lose weight. These results differ from a study regarding diet and physical activity behaviors among Americans (12). In that study, both men and women used similar weight-loss methods to lose weight. Also, unlike our study, their study showed that a higher percentage of females than males were trying to lose weight. These differences could occur because male college students may be more self-conscious about their appearance and weight.

We found that 47.3% of the students surveyed used dietary supplements to lose weight. In a study conducted among 362 high school students, the numbers were almost twice as high (13). In that study, 85% of the adolescents above their average BMI percentile used dietary supplements in order to

decrease weight and body fat. Our results are consistent with another study that showed that 48.5% of 272 college students surveyed took supplements within the past 12 months (3). Apparently, dietary supplement use decreases from high school to college.

Under current laws in the United States, a manufacturer is not required to test the effectiveness or safety of a dietary supplement (14). Fortunately, in our study both men and women were aware of the potential dangers of using dietary supplements. Most agreed that there are potential dangers and there were no differences between them in these beliefs.

In addition, our study showed that the non-immigrant men believed at greater levels than non-immigrant women that dietary supplements are a good way to lose weight, and that they would consider taking weight loss supplements. These results did not occur among immigrants. This could be because immigrants have more trouble speaking or reading the English language. They may not comprehend the labels on dietary supplements and have fewer resources on knowing which dietary supplements are available for them.

This study has some limitations. First, we used self-reported weight and not actual weight measured by someone else. This may be important since one's perceived weight category may affect one's attitude toward weight loss. Second, we found that the majority of the students interviewed perceived themselves to be of normal weight and therefore most likely do not know much about weight loss and what they would do if they needed to lose weight.

## CONCLUSIONS

Men and more specifically non-immigrant men view dietary supplement use as a good way to lose weight at greater levels than women. However, there are no gender differences with regard to the use of dietary supplements among immigrants.

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