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# COMPARISON OF NUTRITION AND DENTAL PRACTICES OF INTERNATIONAL STUDENTS AT THE UNIVERSITY OF NORTHERN IOWA BEFORE AND AFTER COMING TO THE UNITES STATES

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## ABSTRACT

This study examined possible changes in nutrition and dental practices of international students after migration to the United States (US). A random sample of 81 international students at the University of Northern Iowa responded to a mail-in survey in the Fall Semester of 1999 (65% female, 85% over 21 years old, and 54% graduate students). Chi-square analyses showed that, while in the United States, the sample of international students consumed more high fat food ( $p = .002$ ), more high sugar food ( $p < .001$ ), more fast food ( $p < .001$ ), less fruits and vegetables ( $p = .022$ ), and fewer breakfasts ( $p = .23$ ) than they did before coming. They also brushed their teeth more ( $p .031$ ) and sought less dental care ( $p < .001$ ). No significant changes were observed in the consumptions of cereals, protein products, milk, and high caffeine beverages. It was concluded that some nutrition and dental practices of international students studying in the US change for the worse. Implications for culturally appropriate diet education programming for international college students were discussed.

## INTRODUCTION

Behavior-related health issues of international students have received very little research attention over the years.<sup>1, 2</sup> From different parts of the world, students who come to study in the US may bring along different conceptions and practices of health and may react differently to the American health environment. There may exist cultural and social differences that influence health-related behavior of international students. Such influences may be positive or negative. According to Miller and Stephan,<sup>3</sup> adaptation and integration of immigrants in the host society have an effect on their health and well-being. According to the authors, problems of adaptation and acculturation, feeling powerless, and changes in lifestyles may contribute to risky health behaviors.

A few studies on immigrants have shown that some immigrants gradually abandon the health practices of their culture and take on the ones of the host country.<sup>4-6</sup> Tsai et al.<sup>7</sup> compared dieting behaviors of Asian women at a US university with those of corresponding Americans. Specifically, eating and dieting behaviors, body dissatisfaction, self-esteem, and food intake were described and compared between the two samples. Higher levels of restrained eating, binge eating, vomiting, and smoking were reported for the US sample than for the Asian sample. The Asians reported having fewer intakes of dairy products and more intakes of fruits and vegetables. Another study examined eating habits of Asian students before and after entering the US.<sup>8</sup> In all, 62% reported gaining weight ( $n = 63$ ). The number of meals eaten a day had reduced with 46% indicating that they

skipped breakfast in the US. There were significant increases in the consumption of fats, candies, dairy products, and fruits; but decreases in the intake of vegetables, meats, and other protein foods. There was no change in the consumption of cereals and mixed dishes. Changes were more noticeable in those who had stayed longer in the US.

The purpose of this study was to describe health behaviors of international students at the University of Northern Iowa and determine whether there were any changes in the prevalence of these practices after coming to the US. This report is a presentation of the results on nutrition and dental practices.

## METHODS

The research approach was basically descriptive, utilizing a survey method. The basic objective was to collect two sets of descriptive data: health practices of international college students before and after entering the US. These two sets of data were compared.

Study participants were 180 students (45% return rate) randomly selected from a target population of 263 international students from over 60 different countries enrolled in academic programs at the University of Northern Iowa in the Fall Semester of 1999. Participants responded to a 50-item mail-in survey instrument constructed from two previously validated instruments and pilot-tested for multicultural appropriateness. One was the Health Interests and Practices Assessment Survey, designed and used at the University of Northern Iowa by Koch and Davis.<sup>9</sup> The other was the US National College and Health Risk Behavior Survey (NCHRBS) developed by the Centers for Disease Control and Prevention.<sup>10</sup> Brener, Collins, Kann, Warren, and Williams<sup>11</sup> reported reliability data on some of the items of the NCHRBS. There were 11 items on nutrition and dental care. The nonparametric marginal homogeneity and McNair versions of the chi-square test for repeated measures were the statistics used. These were obtained from SPSS.

## RESULTS

### *Nutrition Practices*

Significant ( $p = .023$ ) differences between breakfasts consumed before and after coming to the United States were found. Of the sample, 69% reported consuming breakfast 20 or more times per month before coming to the United States, compared to 54% after coming. Those who ate no breakfast remained about the same while those who ate 1-9 times increased from 16% to 28%. There was a dramatic increase in the consumption of fast food ( $p < .001$ ). The proportion of the sample that ate no fast food before coming dropped from 43% to 17%, and the proportion that ate fast food 1-2 times per month dropped from 49% to 39%. Conversely, the proportion that ate 3-5 times also increased by 100% (14% to 28%) while those who ate 6-10 times jumped from 4% to 15%, an increase of nearly 300%. The rest of the results on nutrition are presented in Table 1 below.

There was a statistically significant reduction in the consumption of fruits and vegetables and increases in the consumption of high fat and high sugar foods. No significant changes in the consumption of cereals, milk, proteins, and high caffeine beverages were observed.

Table 1. Servings of food consumed before and after coming to the United States

		<3/wk	3-6/wk	1/day	2-3/day	4+/day*	(p < .05)
		%	%	%	%	%	
Fruits and Vegetables	Before	10	25	19	32	14	.022*
	After	23	19	20	28	10	
Cereals	Before	9	22	20	33	17	.069
	After	14	22	21	29	14	
Milk	Before	33	13	20	21	4	.454
	After	26	22	26	22	3	
Protein	Before	9	28	30	28	6	.489
	After	10	29	25	28	8	
High fat	Before	48	28	14	8	4	.002*
	After	29	30	24	13	4	
High sugar	Before	46	18	24	11	1	.001*
	After	30	22	23	22	4	
High Caffeine	Before	30	6	18	33	13	.149
	After	22	8	18	41	12	

### *Dental Practices*

Tooth brushing once per day reduced from 24% before coming to the US to 17% after. On the other hand, brushing more than once per day increased from 76% to 84%. These changes were statistically significant ( $p = .031$ ). At the time of the study, 32% of the sample reported never flossing their teeth, compared to 39% before coming. Tooth flossing less than once per day was 31% before coming and 37% after. The proportion that flossed once or more per day before coming remained about the same after coming (27% before and 29% after). Three percent of the sample had never heard of tooth flossing. The p-value (.131) showed that the slight changes in tooth flossing behavior were not significant.

Twenty percent of the sample never made dental visits before coming to the US. This proportion jumped up to 52% after coming to the US, an increase of over 150%. Dental visits made once in more than a year fell from 21% to 17%, once a year from 38% to 18%, and more than once a year from 21% to 13%. This drastic change in dental visit yielded a significant p-value less than .001.

### DISCUSSION

In all, 38% of international students consume at least the recommended servings of fruits and vegetables, down from 42% before coming. It is not easy to explain why international students are eating less fruits and vegetables. One reason could be that these items

are either different or taste different in the US. Also, some international students may not be used to eating “uncooked” food. Again, the cost of fruits and vegetables may be another factor. Fruits and vegetables are among the cheapest food items in many other countries. Compared to the prices of these items in the US, the cost for one orange in the US may be equal to a person’s income in an 8-hour day in some developing country.

The increased consumption of high fat food is not surprising. High fat food is readily available in the US. The diets of many other cultures have very little fat included. While in the US, international students may find it difficult to avoid fatty food. Some may even begin to enjoy the taste of fatty food.

The absolute number of times international students ate fast food may not be high. What should be of concern is the dramatic change from eating very little fast food to eating much more. Fast food eating, without a doubt, is convenient and time saving. For many international students, the pressure of work and loss of control over many cultural and environmental factors in the US may partially account for the increased consumption of fast food. In addition, fast food may taste very good, especially for those whose regular diet does not contain it. The increased fast food consumption may have contributed to the increase in consumption of fat and sugar.

The higher consumption of high sugar food may also have resulted from environmental factors. In the US, sugar foods are relatively cheaper and are found almost everywhere - in the kitchen, laundry rooms, offices and classroom areas. The incessant eating of high sugar foods, such as candies, ice cream, and cookies, and the drinking of sweetened drinks appear to be the normal practice in the US. International students may have caught on with this practice. Unfortunately, the increased consumption of sugar and fat could result in an increase in the risk of dental health problems and chronic diseases. Since the population is not very old the effects of unhealthy eating may not be evident until later in life when it may become too late to correct.

About 78% of the sample consumed at least one serving of a high caffeine beverage per day. High as the consumption of caffeine was, there was no significant difference in the amount consumed before coming to the US. This high consumption of caffeine both before and after coming to the US may be attributable to the fact that many cultures around the world are regular consumers of tea, coffee, and chocolate. These items normally contain high levels of caffeine.

A number of factors may be responsible for the reduction in breakfast eating among international students. Daily meal times may differ from culture to culture. The spacing of meals in the US may differ significantly from what occurs in other cultures. Particularly for those who eat at the university dining centers, the three regular meals have to be consumed over a time span of less than 12 hours. Some students may choose to stay away from breakfast, especially if they are not normally able to get out of bed very early in the morning. Breakfast and lunch may be too close to each other. On the other hand, some students may not find it convenient to wake up early in the morning and be able to prepare breakfast before going to school. This is when grabbing some fast food may become convenient.

Some of the nutritional findings of this study support some of the findings of Pan et al.<sup>8</sup> and Monneuse et al.<sup>12</sup> Pan et al. reported that, after coming to the US, international Asian students reduced their consumption of breakfast, vegetables, and protein products,

but increased consumption of fat, candies, dairy products, and fruits. Monneuse et al. found that, among French college students, 77% of men and 62% of women eat meat everyday while 53% of men and 66% of women eat fruits everyday.

In terms of tooth brushing, all international students take good care of their teeth. All of them brush at least once a day. After coming to the US, more students have been brushing their teeth more than once a day. Tooth flossing, on the other hand, is not very popular with international students. It may be that tooth flossing is not as well known in many developing countries. Also finding the money to provide toothpaste for large families may not be easy and adding tooth floss to the budget may be going too far.

The huge drop in the number of international students who had dental check-up after coming to the US could probably be a result of international students not being able to find their way easily in the new environment, many of them not having a means of transport. The practice of making an advance appointment before seeing a dentist may also be an alien practice to many international students. But, more important, the financial commitment involved may be another hindrance, especially because the mandatory health insurance coverage for international students, obtained through the University of Northern Iowa, excludes dental care. Thus, only when people have a reason to believe they have a tooth problem, and have the money to fix it, are they going to make a dental visit. Regrettably, with the increased consumption of sugar by international students, the risk of getting dental caries may go up.

## LIMITATIONS

Limitations of this study include a low return rate of 45%, and retrospective measurement of the “Before coming” health behaviors of international students. No cause-effect link was established in this study between migration and health behaviors, because the changes in nutrition and dental practices of international students after coming to the United States could have been caused by other factors.

## CONCLUSIONS

International students studying in United States consume more high fat food, more high sugar food, more fast food, less fruits and vegetables, and fewer breakfasts than they did before coming. They also brush their teeth more and seek less dental care.

## RECOMMENDATIONS

In spite of the weaknesses, it is fair to recommend that universities with international students should provide culturally appropriate orientation and continuous health education programs on matters of diet. International students should be assisted to obtain dental care. The need for large-scale studies on the health behaviors of international students is recommended.

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