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A Supplemented Diet: Multivitamin Use among College Students

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A Supplemented Diet: Multivitamin Use among College Students

—Leah Tully (Editor: Jennifer Lee)

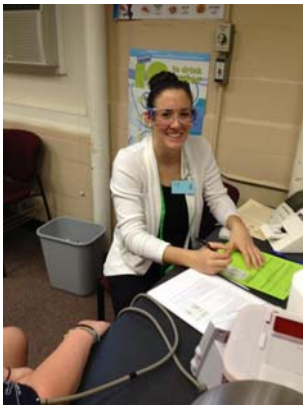
Diet and nutrition play an important role in health maintenance and disease prevention (Balluz, L.S. et al). As Americans seek new strategies to achieve good health, the supplement industry offers many products to fulfill that desire.

Multivitamins are used to supplement a diet that does not meet daily recommendations—to "fill the gaps." Since not everyone can maintain a perfect diet all the time, multivitamins are a way to compensate. People on special diets, such as vegans and vegetarians, may use supplements to get enough B_{12}; or people who live in northern climates or are indoors a lot might supplement with vitamin D.

No standard definition is available for exactly what a multivitamin and mineral (MVM) supplement is (National Institutes of Health, 2006). Therefore, the term can refer to a wide variety of products of many varying compositions. The manufacturers making the supplements determine the types and levels of vitamins, minerals, and other ingredients in their MVMs. Although micronutrient deficiencies other than iron are now uncommon in the United States (Ervin, R. B. et al), and despite the fact that improper MVM use can potentially put users at risk for vitamin or mineral toxicity, we continue to see a growing increase in MVM consumption (National Institutes of Health, 2006). Ironically, populations that are at the highest risk for nutritional shortcomings, i.e., those who might benefit the most from MVM supplements, are among the least likely to use them (Balluz, L.S. et al).

The U.S. Centers for Disease Control and Prevention estimates that 40% of U.S. adults use supplements regularly, but does not provide any information on use by college-aged consumers (Block, G. et al). I wanted to know if the majority of students at UNH were meeting their nutrition requirements. If not, were they taking MVM supplements in order to correct for this inadequacy? And were the students taking the supplements the ones with already adequate diets?

The College Health and Nutrition Assessment Survey



The author takes and records a blood pressure measurement for a CHANAS participant in the fall of 2012.

The data I used for my study was obtained from the College Health and Nutrition Assessment Survey, or CHANAS, a database of information about the health of University of New Hampshire students.

CHANAS is an ongoing project that began in 2005, which collects health, dietary and lifestyle information from students ages eighteen to twenty-four enrolled in the introductory nutrition course (NUTR 400) at UNH. Offered every semester, NUTR 400 meets a general education requirement for all majors; the course also is required for students enrolled in the Nutrition Program as well as those enrolled in allied health majors. At several points during the semester, CHANAS collects anthropometric (height, weight and body composition), biochemical (cholesterol and blood glucose levels), clinical (blood pressure and health history), dietary (three-day food record), and fitness (endurance, strength and flexibility) data from the participants. Approximately 800-900 enrolled students participate voluntarily in the project each year.

I have been working as an integral part of the CHANAS project since my sophomore year, when I was hired as a research assistant under the project leader, Dr. Jesse Stabile Morrell. Since, my role has expanded to include leading training programs for other research assistants and collecting and analyzing data for use by programs on campus like UNH Dining and Healthy UNH. In my junior year (2012-13), I decided to take my role a step further and conduct my own research project for Dr. Morrell's Research Experience in Nutrition course.

Using cross-sectional CHANAS data (observations collected at one specific point in time) collected between 2005 and 2010, I aimed to assess diet quality and MVM usage of college students. Further, I wanted to explore if college students at the University of New Hampshire who were taking MVM supplements were meeting guidelines for an adequate diet. I hypothesized that the students who were taking MVM supplements were more likely to have adequate diets as compared to students who were not taking MVM supplements.

Diet Quality

I based my definition of an adequate diet on the MyPlate recommendations. The Dietary Guidelines for Americans and MyPlate are a set of heavily researched recommendations from the United States Department of Agriculture (USDA) and the Department of Health and Human Services (HHS). The Dietary Guidelines are updated every five years and aim to help Americans make informed food choices in order to maintain a healthy weight, reduce risk of disease and promote overall health. MyPlate includes the five food groups that are the building blocks for a healthy diet: fruits, vegetables, grains, dairy, and protein foods. MyPlate recommendations incorporate the Recommended Daily Allowances (RDAs), which are the amounts of nutrients that will prevent deficiencies and/or excesses in most healthy people. Although some people with average nutrient requirements may eat adequately at levels below the RDA, diets that meet RDAs are almost certain to ensure intake of enough essential nutrients.

To calculate the appropriate RDAs for my project, I had to first determine the average male and female student's height and weight using the collected anthropometric data, as well as their average estimated physical activity as determined via an online wellness survey. The average age for both male and female participants was nineteen and both reported averaging thirty to sixty minutes of moderate physical activity per day. The average height of male

participants was 5'8" and their weight averaged 174 lbs., while the average female height was 5'4" and average weight was 139 lbs. Using this information, I was able to calculate what the average male and female student would need to consume in their diet including their RDAs and MyPlate recommendations website.

Information about the students' diets came from their three-day food records. Students received detailed instructions to improve the accuracy of their data recording, e.g., portion size demonstrations in laboratory sessions. Students selected two week days and one weekend day that were nonconsecutive and representative of their regular routines. All food and beverages consumed, including brand names and food preparation methods, were recorded on log sheets provided in class. Students accessed the online site and entered their three-day dietary information. Daily averages of all nutrients, food group servings, and alcohol were summarized in a printed report produced by online dietary analysis software (DietAnalysis+, 10.0, Cengage).

I took the information from their three-day food record and combined it with the MyPlate requirements for an adequate diet. Subjects were separated into three groups according to the number of MyPlate categories they met (0-1, 2, ≥ 3). Greater adherence to overall MyPlate recommendations was quantified as students who met three or more of MyPlate requirements for the average male or female participant. Eleven students, or 0.3% of the entire cohort (4,351), met all five of their MyPlate requirements.

	Male		Female	
	Recommended	Actual	Recommended	Actual
Grain (oz.)	10	8.4	7	6.8
Vegetables (cups)	4	1.9	3	1.7
Fruit (cups)	2.5	1.7	2	1.3
Dairy (cups)	3	3.2	3	2.2
Meat & Beans (oz.)	7	9.3	6	5.0

Fig. 1: A comparison of MyPlate recommendations and actual average consumption for both male and female participants.

Figure 1 shows the average actual consumption of male and female participants of each MyPlate category compared to the RDA calculated for the average participant of each gender. It is notable that the women were below the RDA in all categories while the men were above the RDA in dairy and meat and beans. This suggests that male participants likely consume more animal products than their female counterparts.

Figure 2 shows the percent of both male and female participants meeting the recommendations outlined in Figure 1. It should be noted that very few of the subjects met their vegetable and fruit requirements, while 62% of males met or exceeded their protein requirement and 49% their dairy. Females did a little better than males in the grain category.

Diet Quality and MVM Use

The wellness survey filled out by each participant asked about MVM use along with other types of supplements. 1,435 students, or 33%, indicated they used MVM supplements. Subjects were separated into the two groups of

MVM users and non-users. Each group was then separated by gender into male and female users and male and female non-users. 34.2% of male participants in the study were MVM users, while 32.4% of female participants were MVM users. Diet quality, based on MyPlate adherence as above, was then compared with MVM use and non-use.

As shown in Figure 3, MVM users had a greater overall adherence to MyPlate recommendations. Participants who reported taking MVM met more MyPlate categories than those who did not. 17% of MVM users met three or more MyPlate categories, while the same was true for just 13% of non-users. The same trend is seen when male and female users and non-users are compared. (See Figures 4 and 5)

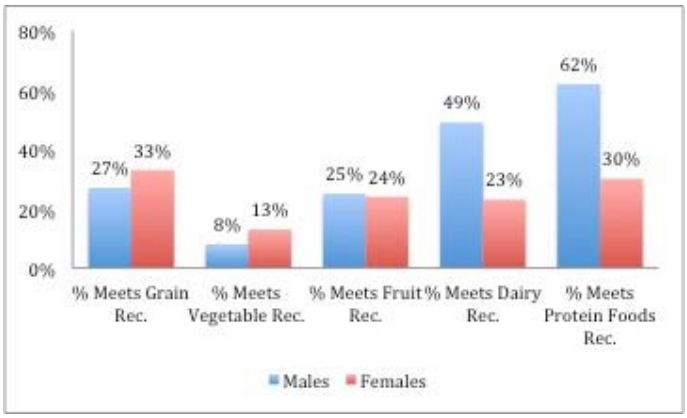


Fig 2: The percent of male and female students who met or exceeded the RDA for each of the 5 MyPlate categories.

These findings support my original hypothesis, which was that MVM users at the University of New Hampshire have a healthier diet than non-users. MVM usage is thought to be part of a clustering of healthy behaviors that may contribute to better overall health (Balluz, L.S. et al). Further research should be done to determine whether students who pay more attention to their health in general, such as taking MVM supplements, have healthier diets overall.

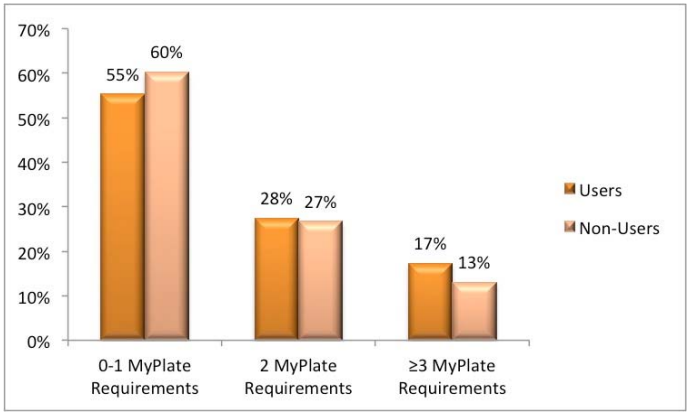


Fig 3: Percent of combined male and female MVM users and non-users in each category of MyPlate adherence.

Since most of the students enrolled in the NUTR 400 classes are freshmen, and the majority of freshmen students live on campus in dormitory buildings with no kitchen facilities, we can assume that most of their meals are coming from UNH dining halls. We know that UNH Dining makes fresh fruit and vegetables available in abundance on a daily basis. Although these students are enrolled in a course to learn about the importance of nutrition, this study suggests that more education is needed for these students to make healthier diet choices in their everyday lives.

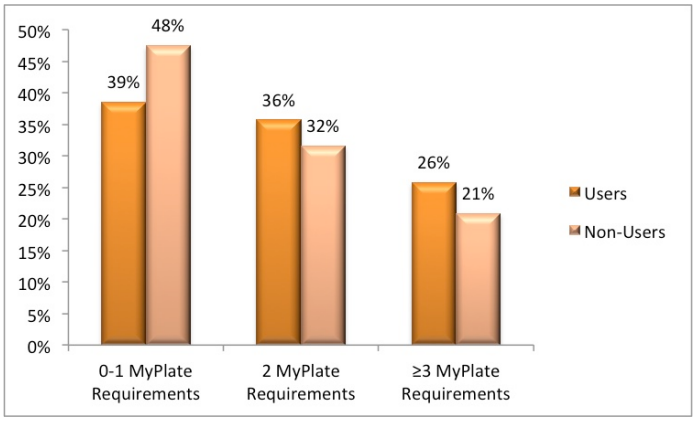


Fig. 4: Percent of male MVM users and non-users in each category of MyPlate adherence.

I would like to thank my parents, Jeff and Jeannine Hughes, for all of their support both financial and

otherwise over the past few years. I would also like to thank my mentor, Jesse Morrell, for encouraging me to complete this project and for fostering an environment where students and young researchers can continue to learn and grow. I am grateful for my research partners Christie Mastriano, Dani Dubois, and Litsa Georgakilas, and also for The Hamel Center for Undergraduate Research.

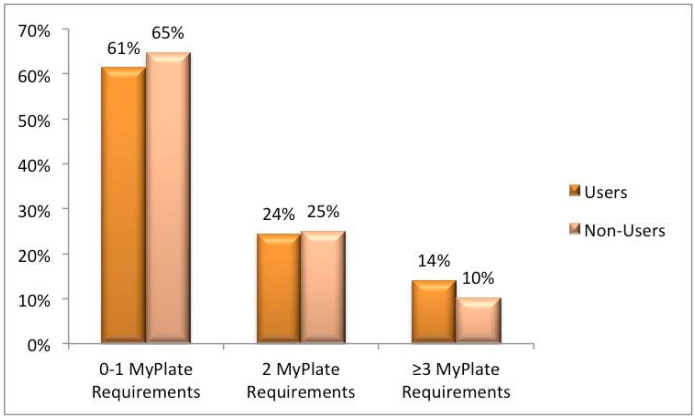


Fig. 5: Percent of female MVM users and non-users in each category of MyPlate adherence.

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Author and Mentor Bios

Her work with CHANAS provided senior **Leah Tully** with her project for the course Research Experiences in Nutrition, taught by Dr. Morrell. The project gave her a “huge respect for career researchers,” she said. She found that she enjoyed the blood drawing necessary for her data. “Human research is really interesting,” she observed. In April 2013 she presented her research at the international Experimental Biology Conference in Boston as well as at the UNH Undergraduate Research Conference, where she received an Award of Excellence. A nutrition and wellness major and a member of Phi Sigma Biological Sciences honor society, Leah will graduate in May 2014 with a bachelor of science. She also has two minors: writing and women’s studies. Writing for Inquiry was a good fit, and her mentor encouraged her to do it. After graduation she would like to work for a company dedicated to educating the public about health and wellness. “There is a huge lack of education about what we are putting into our bodies,” she said.

Dr. **Jesse Stabile Morrell** is a lecturer in the Department of Molecular, Cellular, and Biomedical Sciences at the University of New Hampshire. She has been on the faculty since 2001 and on the Durham campus since 1995, when she arrived as a first-year student. Dr. Morrell leads the College Health and Nutrition Assessment Survey (CHANAS), which, she said, "integrates undergraduate and graduate training and inquiry into multiple components and offers a wonderful venue to support independent research projects." A favorite part of her job at UNH is mentoring undergraduates, and she was "thrilled to watch Leah present her project at the international conference in Boston . . . and confidently engage attendees and answer questions about her project." Dr. Morrell encouraged Leah to write for Inquiry because she feels that "nutritionists and dietitians are always challenged to communicate current scientific information in a manner that is approachable and compelling for their patients and the general public."

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