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Multivitamin Usage and Anemia in College Students

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Introduction

A dietary supplement is defined as a product taken orally that contains one or more ingredients such as vitamins, minerals, herbs, or amino acids that are intended to supplement diet and are not considered food. Multivitamins are a type of dietary supplement that can be prepared in many different forms, such as pills, tablets, capsules, powders, gummies or liquid. Although a standardized scientific definition for a multivitamin does not exist, a multivitamin/mineral supplement (MVMM) is accepted in this study to be a supplement that contains three or more vitamins and minerals, and does not contain herbs, hormones, or drugs.¹

Previous studies have suggested that multivitamin usage among adults in the United States is moderately to highly prevalent, ranging from 35-68.33% of the population.² According to an NHANES survey published in 2007, women in the United States are more likely than men to take a MVMM. Individuals who reported having a high physical activity level were also more likely to report regular consumption of a MVMM.³ Studies investigating supplement usage in athletes have reported a much higher population prevalence of dietary supplementation with 80-98% reporting using some form of dietary supplement. The high level of usage amongst this population is often due to a common belief that dietary supplements will contribute to improved athletic performance.⁴ On the other hand, the general adult population has reported multiple reasons for purchasing and consuming MVMMs, including acting on the advice of a doctor, to improve general health, acting on the advice of family and friends, to allay weakness or fatigue and to improve appetite.⁵

College-aged students are a unique subgroup within the adult population of the United States. University students often exhibit poor eating habits such as skipping meals, eating out/eating at fast food restaurants, and frequent snacking, which predispose them to dietary insufficiencies and various micronutrient deficiencies. Prior research has identified college-age females in particular to be at high risk for nutritional anemia.⁶

Objective

The current study was designed to evaluate sociological and behavioral differences in college students and whether or not these differences have an effect on the likelihood that students choose to take a multivitamin, as well as whether or not multivitamin intake is associated with decreased prevalence of anemia by answering the following questions:

1. Is one gender more likely to consume a daily multivitamin than the other?
2. Does activity level influence likelihood of multivitamin consumption in college students?
3. Are students who take multivitamins more likely to take additional supplements?
4. Are collegiate athletes more likely to take multivitamins than non-athletes?
5. Are college students who take multivitamins less likely to be anemic than those who don't?

These questions were formulated to gain a better understanding of the current prevalence of MVMM and other dietary supplement usage in college students between the ages of 18-22, as well as the prevalence of diagnosed anemia amongst groups within the population. The data derived from this study will be useful in better understanding health disparities related to multivitamin usage and anemia in college students in order to identify and influence appropriate educational outreach initiatives addressing this topic.

Materials and Methods

Study Design

A descriptive cross-sectional study was conducted among male and female undergraduate college students from January to April 2018. Participants for this study were recruited through survey postings on communal Facebook pages for graduating classes, academic club pages, sports team groups, and Greek organizations. The criteria for the study required subjects to be between the ages of 18-22 and currently enrolled at a college or university. Recruitment was conducted for students at the University of Rhode Island, the University of Vermont, and the University of Massachusetts, Amherst. Survey distribution and data collection was done electronically with the use of Google forms. Athletes were defined as any college student who participated in an organized sport run through a college or university. Participants who were not currently enrolled at a college or university, or who were not between the ages of 18-22 were excluded from this study. This study was approved by the University of Rhode Island Institutional Review Board.

Survey

The survey presented questions intended to investigate the research questions stated above. It contained 13 questions assessing age, gender, activity level, multivitamin usage (as well as the form in which they were consumed), adherence to dosage, commitment to a vegetarian/vegan diet, athlete status, other supplement consumption and awareness of anemic status. Participants

responded by choosing the most applicable answer provided. Participants who did not take a multivitamin were also given the opportunity to state in their own words why they chose not to take a multivitamin. Participants who did take a multivitamin were able to select from a list of common formulations or add another option if their form of choice was not listed.

One faculty investigator and one undergraduate investigator from the University of Rhode Island Department of Nutrition and Food Sciences administered this survey. Responses remained strictly anonymous and informed consent was obtained from all subjects who chose to respond to the survey. Participation was entirely voluntary, and no material incentive or reward was offered to students who responded to the survey.

Data Analysis

The information entered by individual participants was automatically recorded and secondarily compiled into a response summary in Google forms. This information was then exported as a Microsoft Excel Spreadsheet for further analysis. Descriptive statistics were applied for demographic and behavioral variables. Calculations were based on information reported about gender, participation in collegiate athletics, general activity level, multivitamin usage, and anemic status. The top three reasons reported for choosing not to take a multivitamin were also identified.

Results

A total of 135 people completed the survey and 129 were included in this study. One survey was omitted from analysis after reporting an age of 23 & over, and five others were omitted after reporting that they were not currently enrolled at a college or university. Of these participants, 95 (74%) were female and 34 (26%) were male. 29 (22%) of participants identified as being collegiate athletes.

Table 1: Summary of Participant Characteristics Based on Multivitamin Usage

Characteristics	n	Non-users (%)	Users (%)	p (V)
All participants		55.8	44.2	0.803
Gender				
Male	34 (26.4)	79.4	20.6	0.005
Female	95 (73.6)	47.4	52.6	0.095
Athletic status				
Athlete	29 (22.5)	58.6	41.4	0.822
Non-athlete	100 (77.5)	55.0	45.0	0.913

Chart 1: Gender and Multivitamin Usage

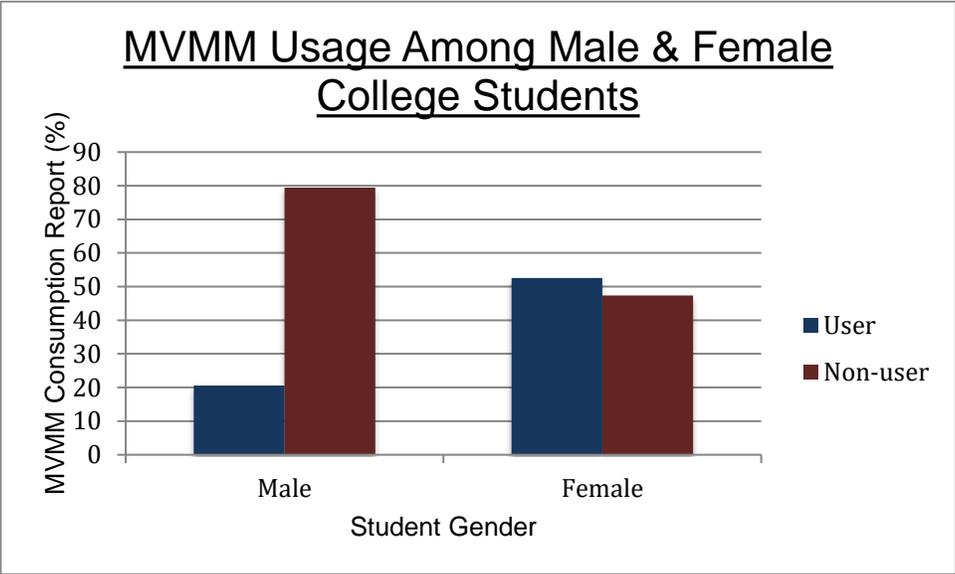


Chart 2: Athletic Status and Multivitamin Usage

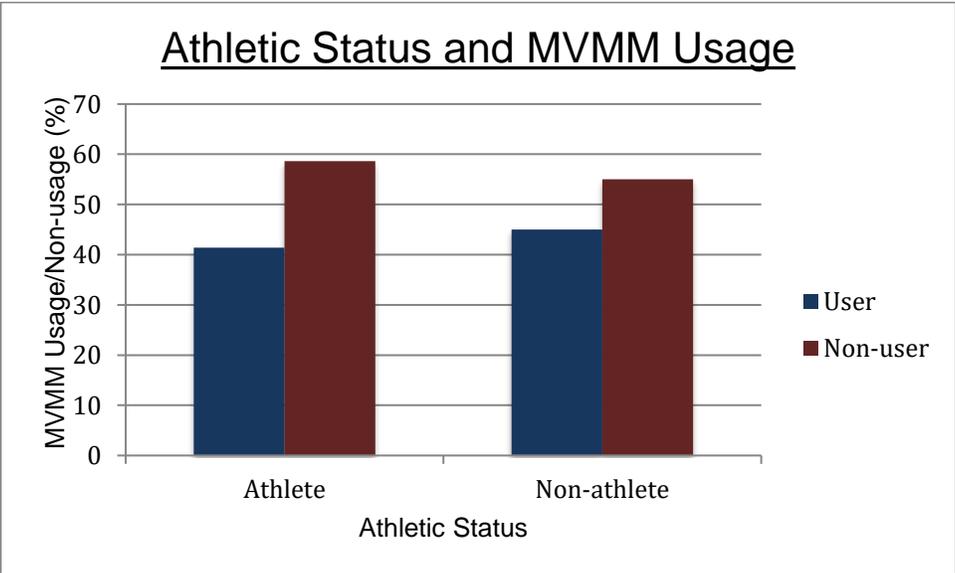


Table 2: Prevalence of Multivitamin Usage in Varying Activity Levels

Activity Level	n	Non-users (%)	Users (%)	p (V)
Sedentary	4 (3.1)	75.0	25.0	0.446
Lightly active	41 (31.8)	56.1	43.9	0.961
Moderately active	64 (49.6)	54.7	45.3	0.860
Very active	20 (15.5)	55.0	45.0	0.941

Chart 3: Activity Level and Multivitamin Usage

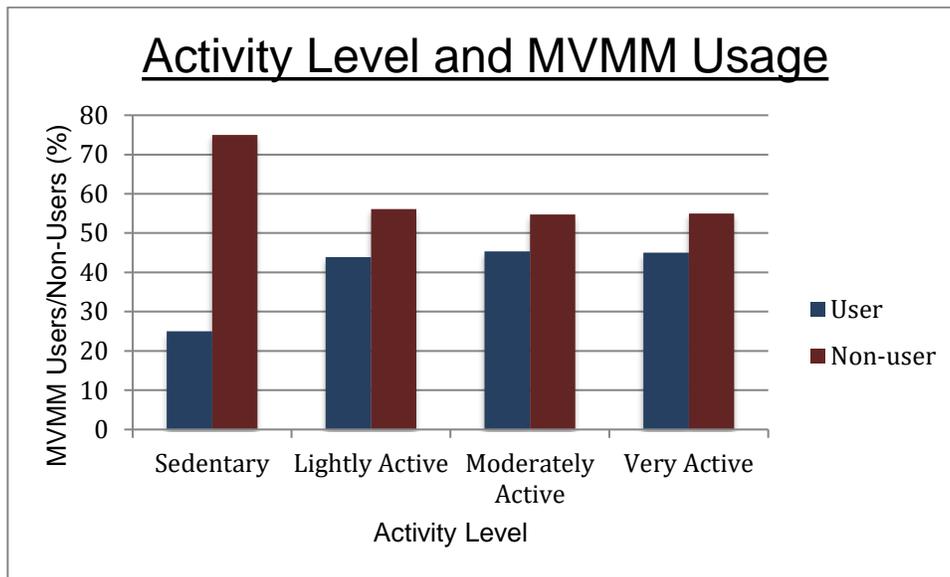


Table 3: Likelihood That Students Who Consume Multivitamins Will Consume Other Supplements

Supplement Consumption	n	Non-users (%)	Users (%)	p (V)
Supplement consumers	45 (34.9)	42.2	57.8	0.0642
Non-supplement consumers	84 (65.1)	63.1	36.9	0.176

Chart 4: Supplement Usage and Multivitamin Usage

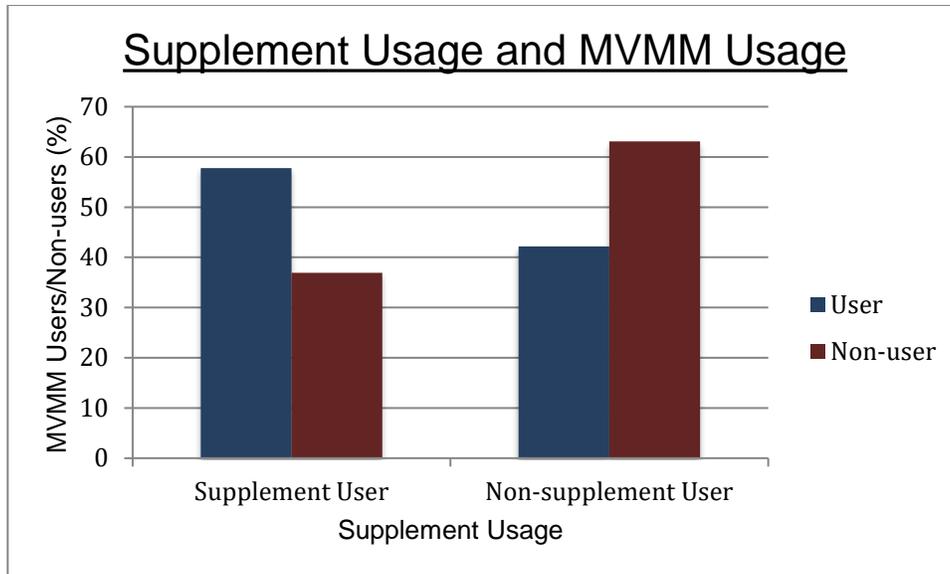
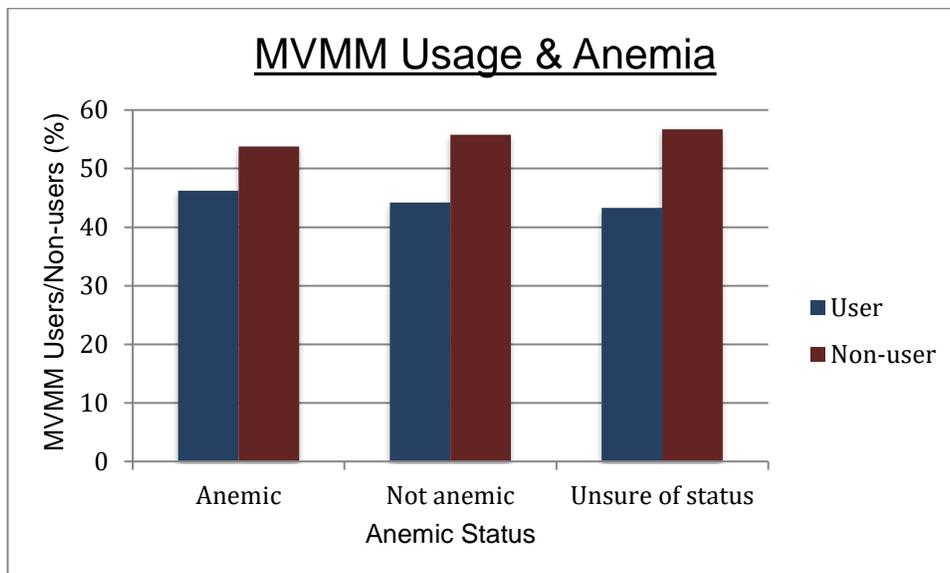


Table 4: Multivitamin Consumption and Self-Reported Anemic Status

Anemic status	n	Non-users (%)	Users (%)	p (V)
Anemic	13 (10.0)	53.8	46.2	0.88
Not anemic	86 (66.7)	55.8	44.2	0.99
Unaware of status	30 (23.3)	56.7	43.3	0.93

Chart 5: Multivitamin Usage and Anemic Status



The data from this survey identifies females as being significantly more likely than males to take a multivitamin. It had been hypothesized that student-athletes

would be more likely than non-athletes to take a daily multivitamin due to a higher level of body awareness and nutrition education. However, no significant difference in prevalence of MVMM usage between student-athletes and non-athletes was found. Individuals who reported a sedentary activity level were less likely to take a MVMM than other students, but there was no significant difference between percentage of users and non-users who self-reported as lightly active, moderately active, or very active. There was no significant difference in supplement usage between MVMM users and non-users, non-supplement users were more likely to also be non-users of MVMMs.

It was hypothesized that there would be a higher percentage of MVMM users among those who self-reported as not anemic than those who reported as being anemic. There was no significant difference among percentage of MVMM users and non-users in terms of self-reported anemic status. When given the opportunity, non-users reported reasoning for not taking a daily MVMM. Among the most common open-response answers for choosing not to take a MVMM was expensiveness of the product, the belief that they did not need to take a multivitamin, and the belief that they were getting adequate nutrients from food alone already. Students who were multivitamin users were given the opportunity to provide an open-ended response about what form they chose to take their multivitamin in. Students were not more inclined either way to take their multivitamin in a pill form or a gummy form.

Discussion

This study was not conclusive in providing adequate information for a clear recommendation to be made on the subject of multivitamin usage in college populations. It is possible that females were significantly more likely than males to take a multivitamin due to the widely accepted fact that young adult females are at an increased risk for iron-deficiency anemia. Physicians may be more likely to push females to take a daily multivitamin because of their inherent risk, although that possibility was not explored in this study. It is also possible that our data on anemic status and multivitamin usage might be different if the study was replicated in a setting where biomarkers could be used to assess anemic status, rather than relying on self-reported information. The issue with self-reported information is the possibility of inaccuracy. Students who are actually unaware of their status might have been inclined to report themselves as “not anemic,” but in reality were just assuming that they were not anemic because they hadn’t recently been tested or updated on their status.

Going forward, more research is needed to identify specific social and behavioral differences that make some students more likely to take multivitamins than others, as well as whether or not multivitamin usage has an effect on the prevalence of iron-deficiency anemia among college students. It is predicted that multivitamins would assist in the prevention of iron-deficiency anemia, but the dietary and lifestyle factors of the average college student may negate some of the benefits of a multivitamin supplement. If multivitamins were identified through further research to be beneficial in preventing iron-deficiency anemia in college

students, the implementation of reduced price multivitamins available for purchase through university health services may be a productive option for making multivitamins available to students at an affordable price.

Conclusion

In conclusion, the females who participated in this study were significantly more likely than males to take a multivitamin, but no other social and/or behavioral differences were identified to have an effect on whether or not students choose to take a multivitamin. There was also no notable difference found in terms of anemic status of students who were multivitamin users versus those who were not. More research on this topic is required to fully understand this potential health disparity, as well as what steps might be taken to address iron-deficiency anemia, as well as other nutrient deficiencies in college students.

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