

NORTHERN ILLINOIS UNIVERSITY

**Examination of the Variance in Fruit and Vegetable Intake among
Faculty and Staff Members within Various University Colleges**

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By

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Capstone Approval Page

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Examination of the Variance in Fruit and Vegetable Intake
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ABSTRACT

The purpose of this study was to assess fruit and vegetable intake among university faculty and staff members. A 15-item online questionnaire was used to collect the data. The 2-Item Fruit/Vegetable Screener developed by the National Cancer Institute were utilized for this survey, with permission. A total of 146 university faculty and staff members participated in this study, with 30 males and 115 females. Information on shopping habits, perceived barriers to fruit and vegetable consumption was also obtained. Results were analyzed using independent t-tests and ANOVA to identify differences in fruit and vegetable intake between age, gender, position and department of participants. Results indicate that the participants consumed an average of 2 servings each of fruits and vegetables per day. No significant differences between age, gender, position or department regarding fruit and vegetable consumption. The results of fruit and vegetable juice were similar. Commonly perceived barriers to fruit and vegetable purchases included lack of time, poor quality of fresh fruits and vegetables in the local markets, and price. Effective nutrition education materials could be developed to meet the lifestyle needs of adults in a university setting and address the identified barriers to fruit and vegetable purchases.

Introduction

The Dietary Guidelines for Americans (DGA) recommends that Americans aged two and over eat more fruits and vegetables than any other food group (1). The information from the DGA 2010 was translated into MyPlate to facilitate the selection of healthy diets for the American consumer. MyPlate encourages individuals to make half of their plate fruits and vegetables in order to meet their specific needs towards building a healthy diet. These recommendations are based on the most current research that demonstrates the benefits of consuming a diet rich in fruits and vegetables and the DGA themselves are updated every 5 years (1). The link between fruit and vegetable intake and chronic diseases continues to be the focus of research and discussion (2). Their research to support the hypothesis that a diet rich in fruit and vegetables can lead to a decreased incidence in chronic diseases, including cardiovascular disease, stroke, type II diabetes, and certain cancers (1, 3, 4, 5). The United States Department of Agriculture (USDA) and the Department of Health and Human Services jointly provide guidelines as to how many servings of fruits and vegetables should be consumed per day (2-6). Current dietary guidelines recommend that adults consume seven to thirteen servings of fruit and vegetables per day to reduce risk of developing chronic diseases, such as cancer, high blood pressure, and diabetes (5). However, most Americans are still not meeting the basic guidelines of 5 servings of fruits and vegetables per day (5). On average, only half the recommended amounts of these foods are being consumed by Americans on a daily basis (6).

The mode for collecting fruit and vegetable data among target populations varies between studies (5). Twenty-four hour recalls, food records, and food frequency questionnaires are often used to examine fruit and vegetable intake among a population, but can be a tedious process for researchers (3). Surveys are also a common method for analyzing fruit and vegetable intake and

can be administered in a variety of ways. Common methods for administering surveys include in-person surveys, telephone surveys, and mail-in surveys (5).

The purpose of this study was to examine fruit and vegetable consumption among adults working in a university setting. This study aimed to find if these adults were consuming adequate amounts of fruits and vegetables, as recommended by the Dietary Guidelines for Americans. I hypothesized that faculty members working in a health-related field would have the highest fruit and vegetable consumption. By examining this particular population and their fruit and vegetable intake, better nutrition education tools could be developed to help fit their knowledge and lifestyle.

Methods

A descriptive non-probability sample design was used for this study.

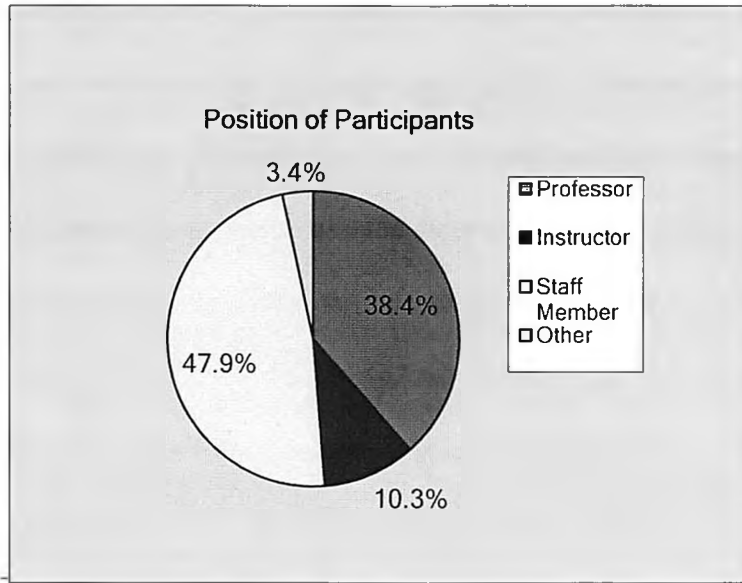
Participants

Adults working in a university setting were recruited to participate in this study. Employment by the university was required in order to participate. Part-time or full-time employment status did not affect eligibility. However, graduate students working under assistantships were excluded from the study. An IRB review form was completed and submitted, but further review using the IRB Screening Form determined that approval was not required for recruitment.

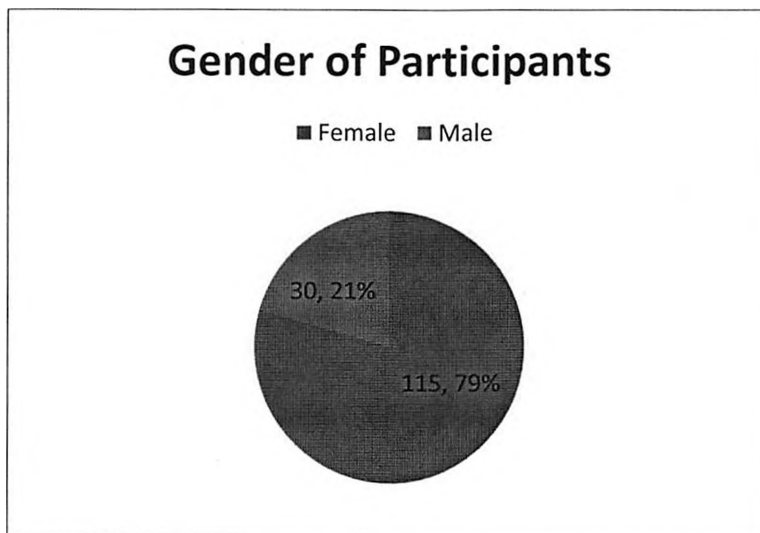
Participants were recruited using a two-step process. An email requesting assistance in the recruitment process was sent to the administrative assistants of various colleges and departments on campus. The email asked that each administrative assistant forward the recruitment letter and online survey link to faculty and staff within their respective

department(s). By clicking on the survey link, participants were transferred to the consent form and subsequent survey. The following charts show the number of respondents for age, gender, and position.

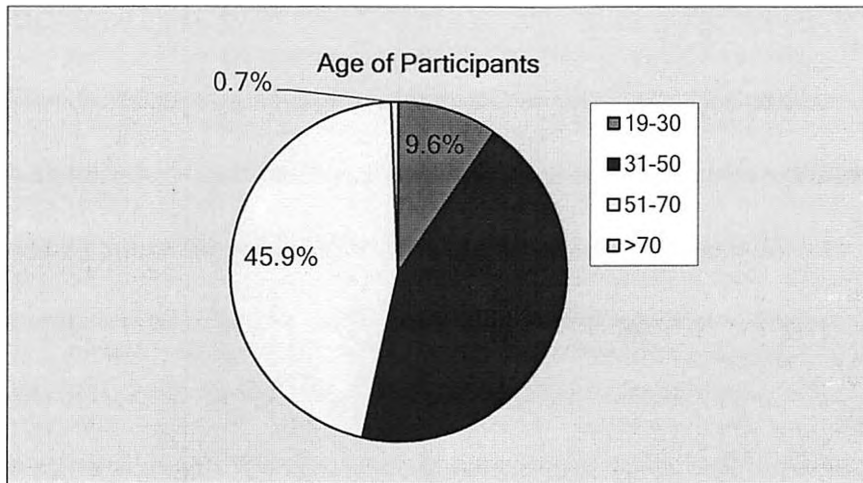
Demographic Chart I:



Demographic Chart II:



Demographic Chart III:



Survey instrument

A 15-item questionnaire was designed using the SurveyMonkey online tool. Both close-ended and open-ended questions were used to gather data about the target population. Demographic information including age, gender, and job title was also collected. These questions were placed at the end of the study to reduce potential influence on their fruit and vegetable intake responses.

Fruit and vegetable intake was gathered using survey questions from the National Cancer Institute's 2007 Health Information National Trends Survey (HINTS). Permission to use the survey questions was granted by the National Cancer Institute because the HINTS items and data are considered public domain. The specific questions utilized from the HINTS survey were the two-item fruit and vegetable screeners. These screeners asked participants about their fruit and vegetable consumption, including "About how many servings of fruit do you eat or drink each day?" and "About how many servings of vegetables do you eat or drink each day?" Participants

were provided with serving equivalents of various fruits and vegetables (ex, 1 c fruit = one small apple, 1 c or 8 oz 100% fruit juice; 1 serving of vegetables = 1 c cooked leafy greens, 1 c cooked beans) to assist them in answering each fruit and vegetable intake question. A close-ended response of 0, 1-2, 3-4, and 5+ served as answer choices for these questions.

Participants were also asked to identify how many cups of fruit and vegetable juice they consumed per day using the two-item screeners. Other items the survey addressed were what fruits and vegetables participants typically purchased, how many times per week they were purchased, and what were their perceived barriers to fruit and vegetable intake.

Results

A total of 146 faculty and staff members employed by the university participated in the study. Within this group of participants, a total of 115 women and 30 men completed the survey; one person declined to reveal their gender. A total of 137 participants reported which department or college they worked for. Since this question was left open-ended, responses were tallied and grouped into one of the following relevant categories: health and human sciences, libraries, liberal arts and sciences, nursing, health services, and various offices.

Results were calculated using the SurveyMonkey online analysis tool, Microsoft excel, and the SPSS statistical tool. These tools were utilized to find correlations and determine significance between the demographics of the sample population and their fruit and vegetable intake.

The following charts demonstrate the amounts of fruits, vegetables, and juices consumed among the entire sample.

Chart 1:

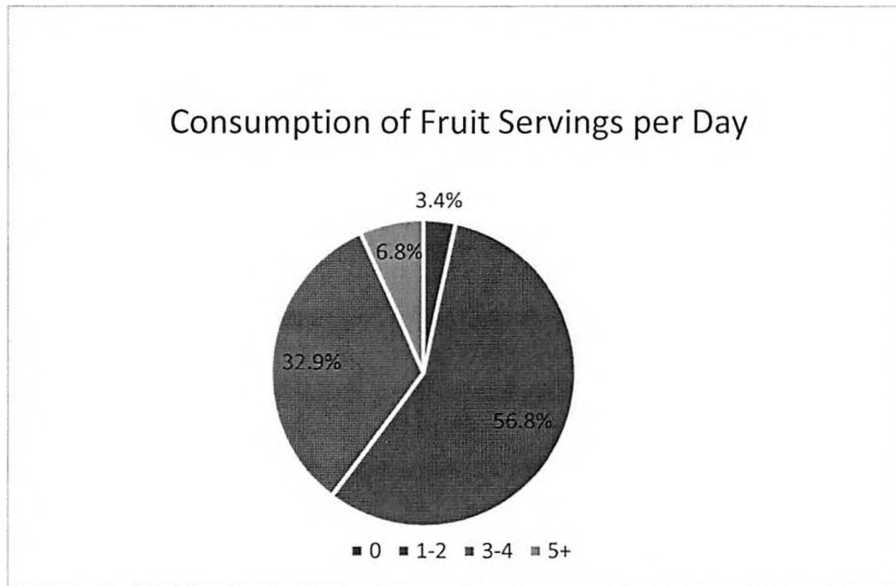


Chart 2:

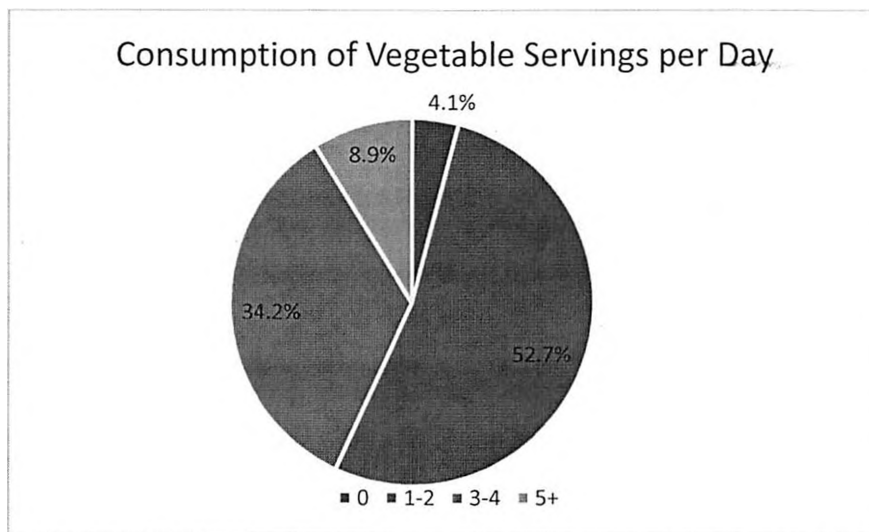


Chart 3:

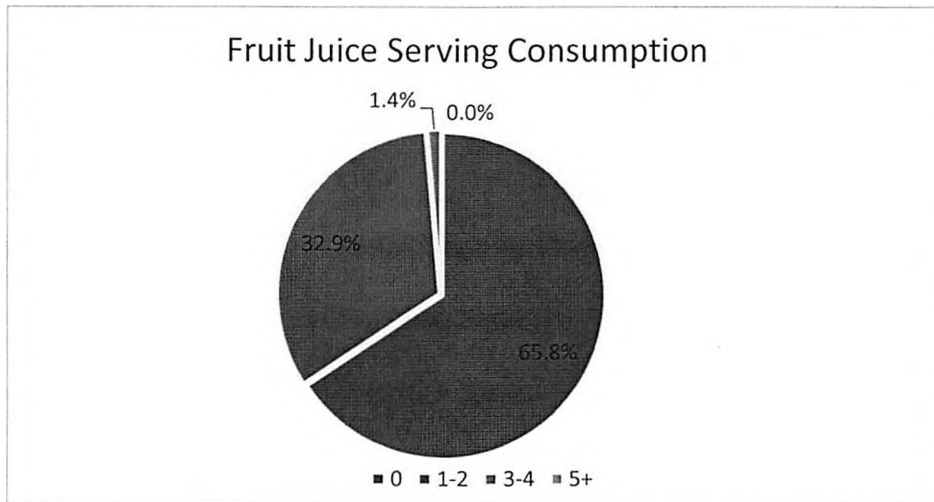
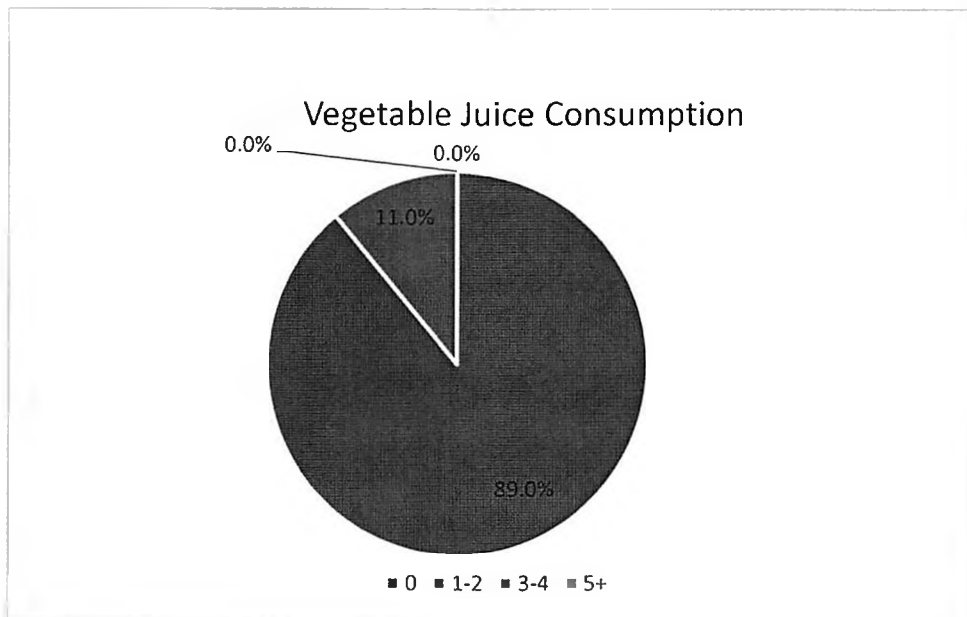


Chart 4:

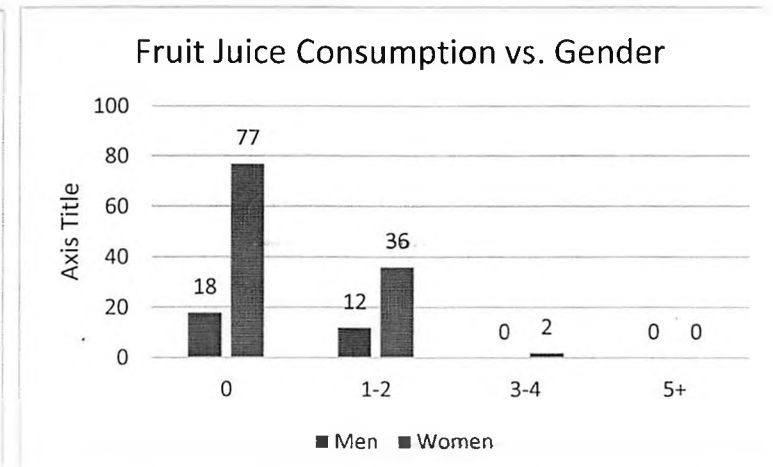
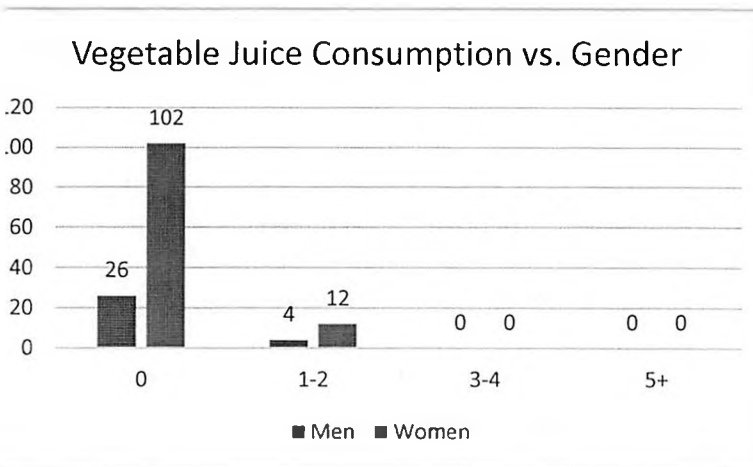
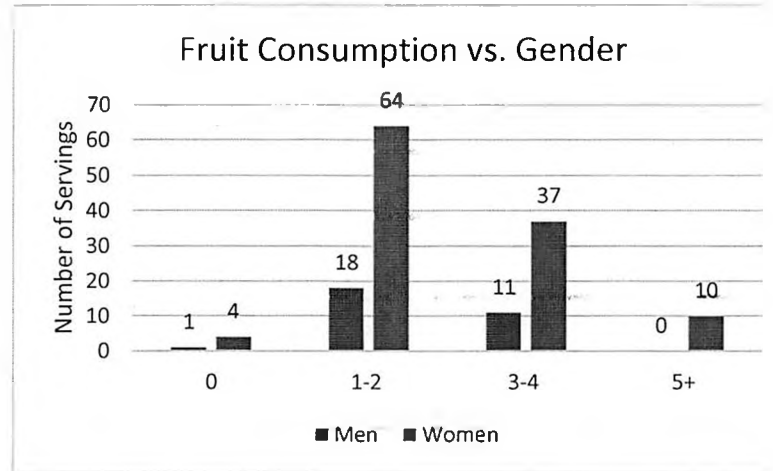
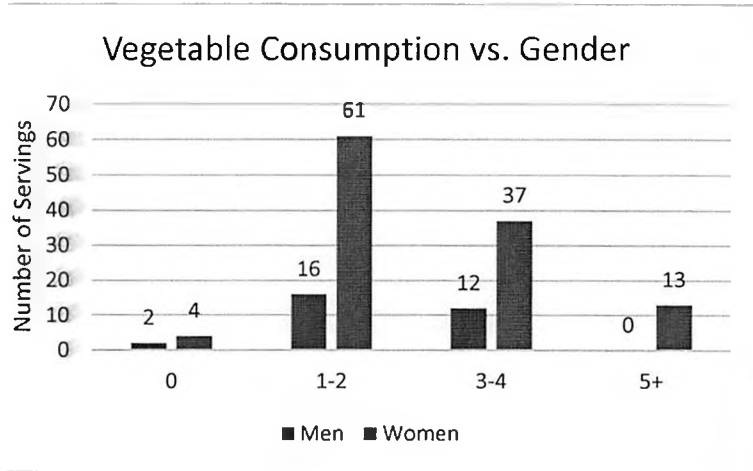


An independent sample t-test was conducted to determine the significance between gender and fruit and vegetable consumption. The following table shows the mean intake for each food item.

Table I: Differences in average servings of fruit and vegetable intakes by Gender

Food Item	Males N= 30	Females N = 115
Vegetable intake (mean ± Std. Dev.)	2.33 ± 0.61	2.51 ± 0.74
Vegetable juice intake (mean ± Std. Dev.)	1.13 ± 0.35	1.11 ± 0.31
Fruit intake (mean ± Std. Dev.)	2.33 ± 0.55	2.46 ± 0.74
Fruit Juice intake (mean ± Std. Dev.)	1.43 ± 0.50	1.39 ± 0.51

Charts 5, 6, 7, 8



Further analysis of the results revealed that significance values were greater than 0.05. It was determined that there was no significance between gender and fruit and vegetable consumption.

Another objective of the research was to examine the variance in fruit and vegetable consumption among the faculty and staff within the sample. An ANOVA was run in order to determine any significance between department and fruit, vegetable, and juice intake.

Table II: Differences in average servings of fruit and vegetable intakes by department

Department/College (N)	Vegetable Mean ± Std. Dev.	Fruit Mean ± Std. Dev.	Vegetable Juice Mean ± Std. Dev.	Fruit Juice Mean ± Std. Dev.
Health Services (8)	2.75 ±0.71	2.50 ±0.76	1.25 ±0.46	1.38 ±0.52
Nursing (12)	2.68 ±0.78	2.50 ±0.52	1.0 ± 0.0	1.25 ± 0.45
Libraries (21)	2.29±.64	2.38±0.74	1.14±0.35	1.38±0.49
CHHS (29)	2.62±.82	2.41±0.77	1.10±0.30	1.31±0.47
CLAS (39)	2.48±0.72	2.46±0.64	1.07±0.26	1.41±0.54
Other (28)	2.28±0.65	2.5±0.63	1.11±0.32	1.35±0.48
Total (137)	2.47 ±0.73	2.45 ±0.68	1.03 ±0.31	1.36 ±0.50

The mean intake of fruits, vegetables, and juice were similar for each department, consuming around 2-2.75 servings of vegetables, 2-2.5 servings of fruits, and about 1 serving of fruit and/or vegetable juice. Statistical analysis of these results determined that there was no significant difference ($P>0.05$) in mean intakes of these food items between each department.

Examining the relationship between and job position fruit, vegetable, and juice intake was also examined in this study. The following table shows this relationship.

Table III: Mean intakes by position

Position (N)	Vegetable Mean ± Std. Dev.	Fruit Mean ± Std. Dev.	Vegetable Juice Mean ± Std. Dev.	Fruit Juice Mean ± Std. Dev.
Professor (57)	2.5 ± 0.71	2.51 ± 0.63	1.09 ± 0.29	1.37 ± 0.52
Instructor (15)	2.67 ± 0.82	2.60 ± 0.74	1.0 ± 0.0	1.26 ± 0.46
Staff (69)	2.42 ± 0.69	2.29 ± 0.67	1.15 ± 0.36	1.34 ± 0.51
Other (5)	2.40 ± 0.89	3.0 ± 0.71	1.20 ± 0.45	1.60 ± 0.55
Total (146)	2.48 ± 0.72	2.43 ± 0.67	1.11 ± 0.31	1.36 ± 0.51

Examination of these results revealed no significant difference in fruit, vegetable, and juice intake between job titles among the sample. Mean intakes were similar for each food item among each department.

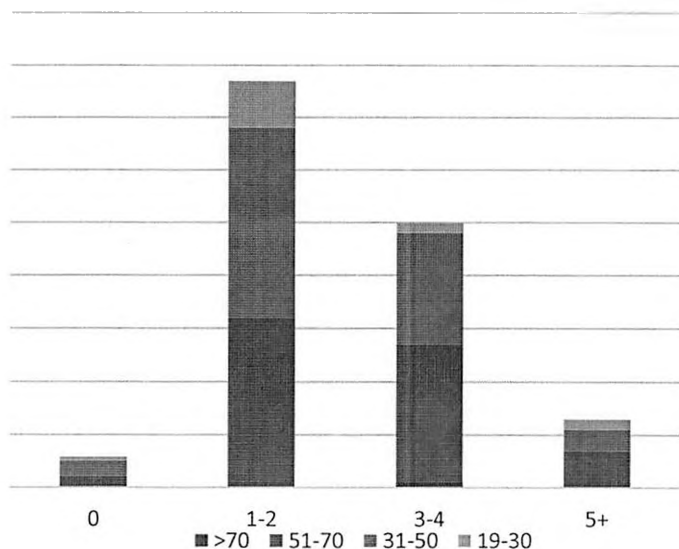
Age was also cross tabulated with fruit and vegetable consumption within the sample. The following table and charts show the relationship between fruit, vegetable, and juice intake.

Table IV: Mean intakes by age

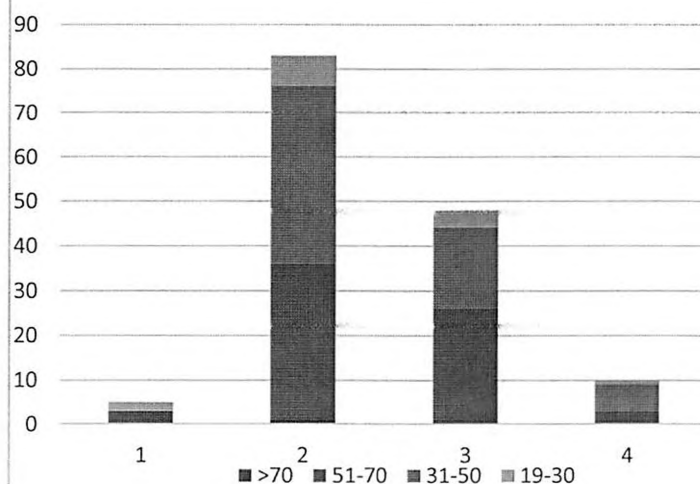
Age (N)	Vegetable Mean \pm Std. Dev.	Fruit Mean \pm Std. Dev.	Vegetable Juice Mean \pm Std. Dev.	Fruit Juice Mean \pm Std. Dev.
19-30 (14)	2.36 \pm 0.84	2.29 \pm 0.83	1.0 \pm 0.0	1.21 \pm 0.43
31-50 (64)	2.41 \pm 0.68	2.47 \pm 0.67	1.08 \pm 0.27	1.28 \pm 0.45
51-70 (67)	2.57 \pm 0.72	2.43 \pm 0.66	1.16 \pm 0.37	1.44 \pm 0.56
71+ (1)	3.0 \pm 0.0	2.0 \pm 0.0	1.0 \pm 0.0	2.0 \pm 0.0
Total (146)	2.48 \pm 0.72	2.43 \pm 0.67	1.11 \pm 0.31	1.36 \pm 0.51

Charts 9, 10

Age vs. Vegetable Intake

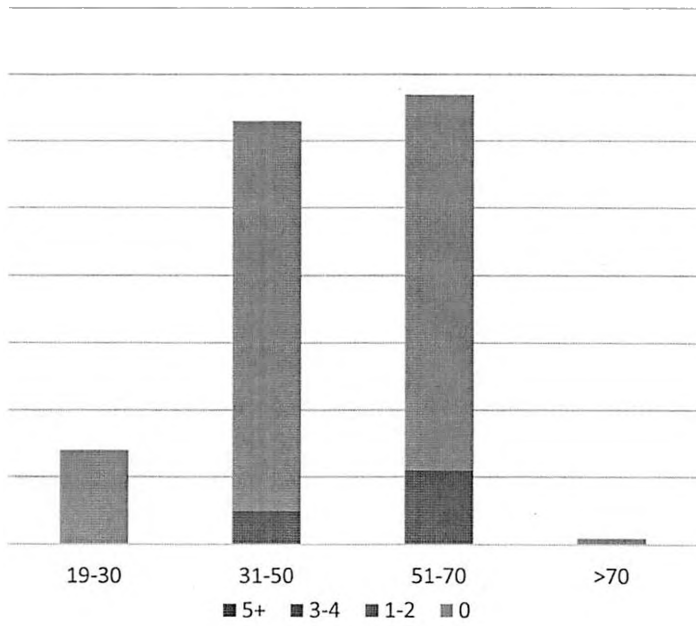


Age vs. Fruit Consumption

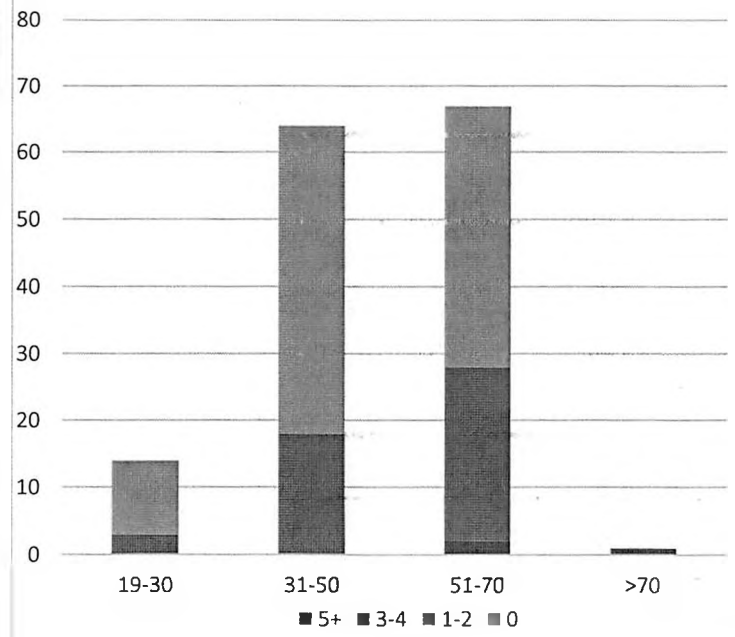


Charts 11, 12

Age vs. Vegetable Juice Consumption

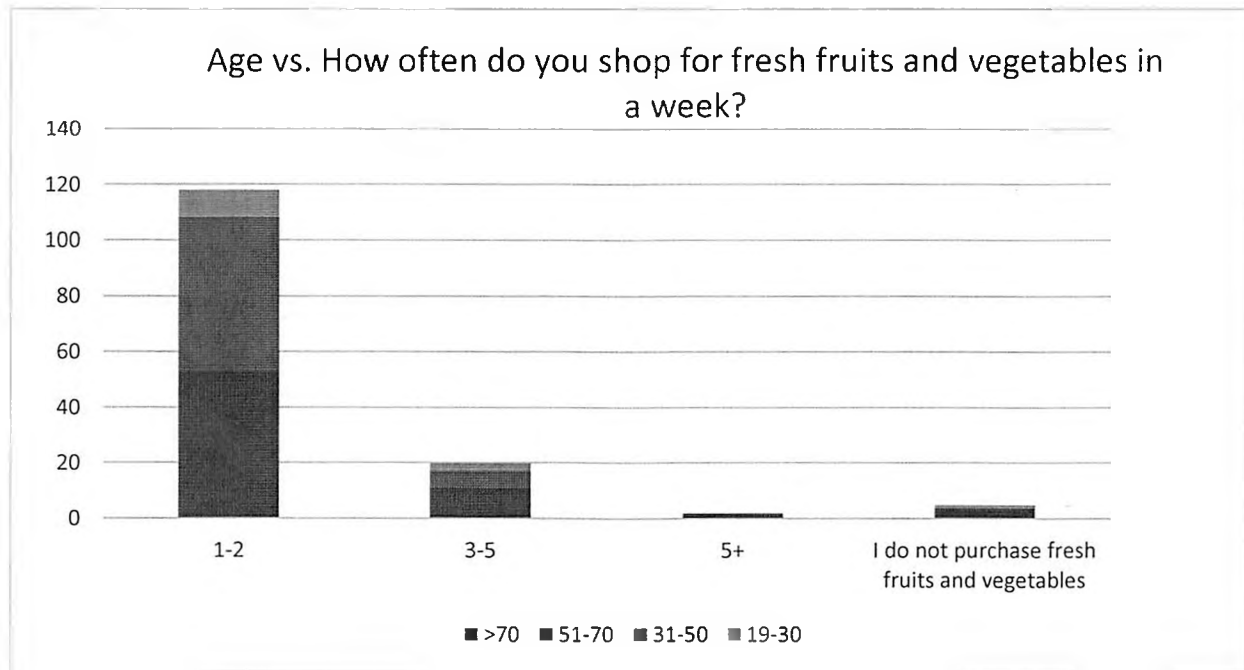


Age and Fruit Juice Consumption



Analysis of the charts also suggests that age does not have significant effects on the intake of these foods. Participants were also asked to identify how many times per week they purchased fresh fruits and vegetables. These responses were cross tabulated with age to demonstrate the relationship between age and shopping habits.

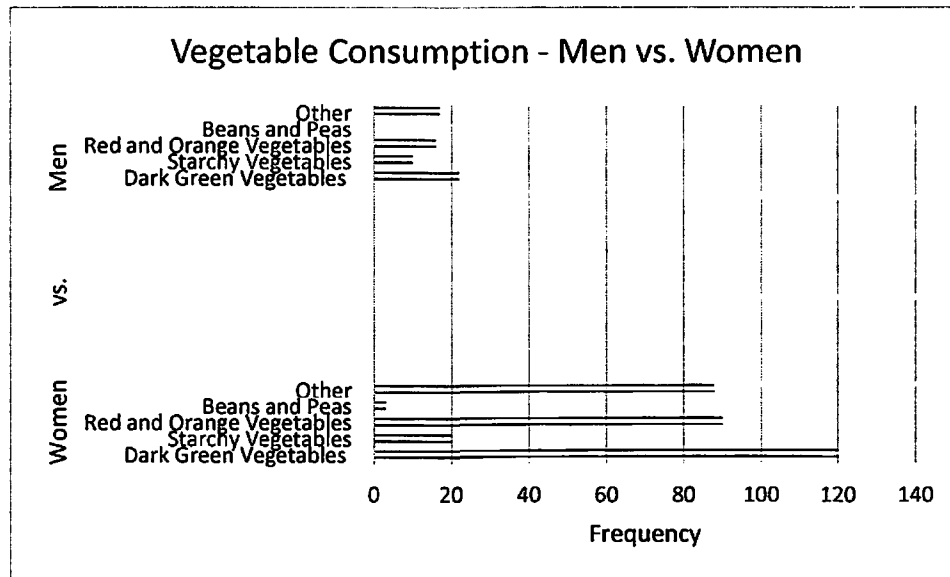
Chart 13:



This chart shows no significant relationship between age and shopping habits.

Part of the dietary guidelines is to consume a wide variety of fruits and vegetables (1). Participants were asked to name 1-3 types of vegetables that they consumed on a regular basis. Results were tallied and grouped into categories that are set by the dietary guidelines. The following chart shows the amount of each type of vegetable consumed among men and women in the sample.

Chart 14:



This chart demonstrates that many of the men and women in the sample are consuming many different kinds of vegetables, especially dark green vegetables.

Discussion

The results of this project indicate that many adults do not consume adequate amounts of fruits and vegetables on a regular basis. The majority of participants in this study reported a fruit and vegetable intake of 1-2 servings per day, consuming less than half of the 5 servings per day recommended by the Dietary Guidelines for Americans. As noted in the review of literature, inadequate fruit and vegetable intake in adults is common. Increasing nutrition education among this age group could increase their fruit and vegetable intake and decrease the occurrence of chronic disease.

The results of the study did not find a significant relationship between fruit and vegetable intake and the gender of participants. The unequal distribution of males and female responses within in the sample may have contributed to the skewed results. Only 30 males responded to the survey compared to the 115 females who responded. The results also found there to be no significance between which department participants worked for and their fruit and vegetable intake. Reasons for this could be due to sample size and lack of specific answers in regards to department. In addition, not every university department was represented in the sample, due to lack of participation from certain departments. Although there were limitations to the study, the results demonstrate that age, gender, and type of work do not necessarily influence fruit and vegetable intake among individuals.

The results of this study did find that mean intakes of whole fruits and vegetables were higher than the mean intakes of fruit and vegetable juices among all age groups, gender, and departments. Consumption of whole fruits and vegetables over juices is recommended by the dietary guidelines in order to increase overall fiber consumption.

This study also addressed the types of fruit and vegetables that were purchased among participants. As shown in the chart above, most participants shop for fruits and vegetables 1-2 times per week. The most common vegetables purchased are carrots (N = 59), broccoli (N= 54) and lettuce (N=52). The most common fruits purchased include apples (N= 10), bananas (N= 94), berries (N = 70). Reasons for these purchases could include price, quality available in local markets, and availability. Suggestions for future studies include examining the correlation between types of fruits and vegetables purchased and the reasons for doing so.

Common statements made by participants for what prohibits them from purchasing fruits and vegetables on a regular basis include time (N=23), cost (N=21), and quality of items

available (N=17). Future studies could also examine barriers to fruit and vegetable intake and find correlations among age, gender, and income.

The results of this study also found that a majority of participants try to eat a wide variety of fruits and vegetables. The Dietary Guidelines for Americans recommend that foods from each of the following categories are consumed in order to receive their unique health benefits: dark green vegetables, red/orange vegetables, beans and peas, starchy vegetables, and other (cucumbers, avocado, eggplant). This study found that both men and women employed by the university were consuming various dark greens, and vegetables that fell into the “other” category. Consumption of beans and peas was low among both groups. Future studies conducted could examine the types of fruits and vegetables consumed and find correlations among age and gender.

Conclusion

Most American adults are not consuming an adequate amount of fruits and vegetables. This study showed that a majority of adults are still only eating 1 to 2 servings of vegetables per day. This study found no significance between department, age, or gender in regards to fruit and vegetable intake. The study also revealed that mean intake of whole fruits and vegetables were higher than mean intake of juices.

Income levels were not addressed in this study, but could have possibly been used to strengthen the results. Other limitations to this study include the small sample size and lack of consistency between answers in regards to which department the participants worked for. Narrowing down departments into more specific categories could potentially find stronger correlations between education and fruit and vegetable consumption.

The strengths of this study identified the need for improved nutrition education for adults. The results of this study could be used in the development of nutrition education materials that suit the lifestyles and education level of adults. Developing nutrition education materials that help individuals overcome their barriers to fruit and vegetable consumption would also be a benefit of this study. Teaching individuals how to incorporate more fruits and vegetables into their meals at home may also lead increased fruit and vegetable consumption. Addressing ways to prepare quick, healthy meals that cost less could also help increase fruit and vegetable intake among adults.

Future research could focus more precisely on the education level, income, and fruit and vegetable intake. Development of unique nutrition education materials that suit the lifestyle of adults is an important step to increase their fruit and vegetable intake.

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