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Nutrition Interests of FSU Students, Their Preferred Information Sources and Perceived Credibility

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NUTRITION INTERESTS OF FSU STUDENTS, THEIR PREFERRED INFORMATION SOURCES AND PERCEIVED CREDIBILITY

By

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ABSTRACT

Purpose

Due to ease of access to nutritional misinformation, it becomes difficult for the public to identify credible and current information. Adding to this, many individuals have not learned how to distinguish between trustworthy and untrustworthy information sources (Wansink, 2006). This study investigated the preferred sources of nutrition information by FSU students, reasons for their preference, their belief in the reliability of these sources, students' confidence in their ability to find credible nutrition related information.

Methods

Internet surveys were distributed using Qualtrics to students over 18 years old at Florida State University. Surveys were emailed to students through departmental emails and word of mouth. Data collection was completed through Qualtrics. Data analysis was completed with IBM SPSS Statistics 25 software for Windows, Version 25.0. released in 2017.

Results

293 student participants (24.6% males and 75.1% females) were included in this study from at least 8 different areas of study. The top three most preferred nutrition information sources were Social Media (Instagram, Facebook, Pinterest) (12.4%), Medical Doctors (9.4%), and Nutritionists (7.6%). The most important reasons for selecting preferred sources of nutrition information included: credibility (50.17%), convenience (31.7%), and possible effectiveness (9.6%). The most credible nutrition information sources were shown to be Registered Dietitians (87.7%), Nutritionists (81.9%) and Medical Doctors (77.8%). The least credible sources of

nutrition information were Celebrities (34.8%), Social Media (27.9%), and Television (25.3%). The sources which were considered to be backed by sufficient research all of the time included: Registered Dietitians (63.1%), Nutritionists (58.4%) and Medical Doctors (52.7%). Social media was one of the least credible sources and the least likely to have information backed up by sufficient research. 90.8% of the participants in this study were at least somewhat confident of their ability to find credible nutrition information. Only 6.8% of participants have passed a nutrition course in college. This group of individuals valued credibility no more than the rest of the participants.

Conclusion

The students studied were confident in their own ability to find credible nutrition information sources and viewed credibility of information as the most important reason when it comes to choosing nutrition information sources. They are aware of the unreliable information they get from their most preferred source which is social media, and of the availability of more reliable nutrition information sources. However, students do not choose to use sources with information supported by sufficient research, the reason for which was not explored. Further research to explore the cause of this behavior and incongruous thinking is recommended. Every college student should have evidence-based nutrition and health education.

CHAPTER 1

INTRODUCTION

Americans have been getting larger as the population ages. 19% of children and 37% of adults meet the criteria for classification as obese (The State of Childhood Obesity, 2018, Overweight & Obesity, 2018). College is a key turning point for many individuals as it is the time of autonomy for those who are living alone for the first time. This forces young adults to start developing their own routines, and preferences. These include diets and food habits that may be used for the rest of their lives (Nelson et al., 2012). Thus, college years could be an opportunity to maintain or improve weight status for many. However, this population, in particular faces many challenges that can push their nutrition plans into unhealthy direction.

Many college students experience weight gain during college (Vella-Zarb & Elgar, 2009, Gropper et al., 2012, Pope et al., 2017), and the percentage of students that become overweight or obese in college is growing (Racette et al., 2008, Gropper et al., 2012, Pope et al., 2017). Fast foods are popular among college students (Driskell et al., 2005, Jeffries et al., 2018) with 90% of all the participants consuming foods from fast food restaurants 6-8 times per week (Driskell et al., 2005) and 48.8% of participants consumed sugar-sweetened beverage (SSB) more than once a day (Jeffries et al., 2018). Consumers also consume more added sugar, fat, and sodium (Powell & Nguyen, 2013). These meals are typically high in calories, with the average meal calorie being over 800 calories (Block et al., 2013), and the energy content can easily be underestimated (Block et al., 2013, Franckle et al., 2016).

On top of increased fast food consumption, a decrease in fruits and vegetables intake (Tam et al., 2017) along with a lack of physical activities (Young et al., 2015, Jeffries et al., 2018) also contribute to students' weight gain during college. On average, students consumed 3

servings of fruits and vegetables per day (Tam et al., 2017). Only 49% of the students were regularly physically active in Young's study (Young et al., 2015). As much as 50% of students even skipped breakfast (Driskell et al., 2005, Jeffries et al., 2018)

It's unavoidable that the Internet is now a major resource for finding health information for college students (Lenhart, 2010, Percheski & Hargittai 2011).Regardless of source or credibility, many students have difficulty evaluating the quality and credibility of Internet resources. Studies have shown that professionals were not the primary sources of nutrition or health information for college-aged students (Lenhart 2010, Percheski & Hargittai 2011). Many tend to "Google" health-related questions without examining the dependability of the sources (Escoffery et al., 2005, Rennis et al., 2015, Senkowski & Branscum, 2015, Hayes et al., 2016). Lenhart showed that young adults age 18 to 29 have the highest percentage of any age group who search for online health information (72%). 73% of the students in Escoffery's study used the Internet to obtain health information. 78% of the students searched for health information online in Percheski and Hargittai's study (Percheski & Hargittai 2011). Hasty's colleagues found that Wikipedia articles related to the major depressive disorder, osteoarthritis, chronic obstructive pulmonary disease, and diabetes mellitus to have statistically significant discordance with peer-reviewed sources for the content accuracy.

Health literacy has been defined as "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions" (Centers for Disease Control and Prevention, 2015). Only 12% of the U.S adults had proficient health literacy skills in the most recent National Assessment of Adult Literacy (White et al., 2006). This might be expected as adequate health literacy requires many skills (White et al., 2006). Corcoran presented three components toward adequate health

literacy which include clinical domain, prevention domain and navigation of the healthcare system domain (Corcoran, 2013). For eHealth literacy, Norman and Skinner developed six core skills that combine eHealth literacy or types of literacy: traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy (Norman & Skinner, 2006). Kontos and colleges believed in the importance of possessing skills to understand and navigate healthcare, health information-seeking, and user-generated content/sharing (Kontos et al., 2014). One issue many students face is that they seem to falsely believe they have adequate health literacy (Ivanitskaya et al., 2006, Senkowski & Branscum, 2015) when research has shown that many students do not possess the knowledge and skills to accomplish this (Ivanitskaya et al., 2006, Kim et al., 2011, Stellefson et al., 2011, Hasty et al., 2014, Carrotte et al., 2015, Senkowski & Branscum, 2015, Hayes et al., 2016), except for those with exceptional research skills (Ickes & Cottrell, 2010). Almost half of the participants were unable to discriminate between primary and secondary sources of information as well as between references to journal articles and other published documents. In the study by Ivanitskaya et al, 84% of the participants believed they had at least "good" research skills, however, self-reported skills were weakly correlated with actual skill level (Ivanitskaya et al., 2006). When students "Google" the topic of health and nutrition, they try to use their best judgement when evaluating websites based on publication dates and repetitions but fail to recognize a site's domain and sponsor (Kim et al., 2011, Rennis et al., 2015, Senkowski & Branscum, 2015). In Senkowski & Branscum's study, ¾ of the participants rated their ability to make appropriate weight loss decisions using online information as average to excellent. In contrast to their self-perceived ability, during the study, students used mostly the top 3 results in Google to search for answers. Many had trouble understanding weight-related terminologies and often had difficulties with

discerning “credible” information (Senkowski & Branscum, 2015). Stellefson and colleagues review concluded that students lack eHealth literacy skills, suggesting that there is significant room for improvement in college students' ability to obtain and evaluate eHealth information (Stellefson et al., 2011). In the year 2018, it has been projected that 20.7 million students will be enrolled in postsecondary institutions. Yet college students have shown in studies that they do not have enough nutrition knowledge or health literacy skills to find dependable and accurate nutrition and health information online (White et al., 2006, Ivanitskaya et al.,2006, Dobransky & Hargittai, 2011, Kim et al., 2011, Carrotte et al., 2015, Senkowski & Branscum, 2015, Helm & Jones, 2016). Expected outcomes include: the students’ most preferred source of nutrition information would be the Internet. Convenience would be the most important reason for choosing resources. The students would not rate their most preferred nutrition information sources as the most credible source. Most students would rate their confidence in their ability to look for credible nutrition information as average or above. Lastly, students that have passed a college level nutrition course would rank credibility to be the most important reason for choosing information sources. The objectives of this investigation include: (1) Find out what nutrition topics interest students the most and how they would want to obtain nutrition information, (2) determine college students’ most preferred sources of nutrition information and the reasons for choosing them, (3) how credible they think their own most preferred sources of nutrition information are and (4) how confident are they with their ability to find credible (based on peer-reviewed studies) nutrition information.

CHAPTER 2

REVIEW OF LITERATURE

Statement of the Problem

Obesity rates have nearly tripled since 1960 (13%-39%) and have doubled since the 1980s (23%-39%) according to the Center for Disease Control and Prevention (Fryar et al., 2016). The average national BMI has been increased from 26.6 for men, 26.5 for women in 2003 to 28.7 for men and 29.2 for women in 2011-2014 (Fryar et al., 2016), as well as diabetes rates (U.S. Diabetes Surveillance System 2018). Overweight and obesity are linked to the development of chronic diseases, increased comorbidity and mortality in the United States. According to the National Health and Nutrition Examination Survey (NHANES, 2013), in the U.S., 19% of children 2 to 19 years of age are obese (The State of Childhood Obesity, 2018) compared to 37% of American adults who are obese according to the CDC in 2018. So, why does the obesity rate almost double after in adulthood?

Being overweight or obese puts individuals at risk for chronic diseases such as type two diabetes, cardiovascular diseases, renal diseases, chronic inflammation, cancer and many more (Kermani & Kermani, 2004). Overweight and obesity are preventable are preventable or can be managed through healthy lifestyle habits such as exercise and nutrition. Healthy lifestyles need to be developed at a young age, if not then the unhealthy lifestyles of young adults may continue after high school.

College is an important time of change. It is estimated that there will be 21 million college students will be enrolled in 2018 (National Center for Education Statistics). New freshmen make the transition from living at home with their family to living independently away from home. This forces them to start developing their own habits, routines, and preferences,

including food and leisure activity decisions (Nelson et al., 2012). It is easy for this group of adults to be exposed to and influenced by the Internet that steers them toward unbalanced eating behaviors. Studies have shown that college students do not make healthy choices. Some common unhealthy choices include, high consumption of "fast food" (Powell, L. M., & Nguyen 2013; Franckle et al., 2016; Block et al., 2013), low fruit and vegetable intake (Tam et al., 2017) and poor eHealth literacy skills that would otherwise enable them to find credible and helpful nutrition information (Escoffery et al., 2005, Ivanitskaya et al., 2006, Ivanitskaya et al., 2010, Carrotte et al., 2015, Dobransky & Hargittai, 2011, Senkowski & Branscum, 2015, Kim et al., 2011). The results of developing unbalanced eating habits and unhealthy lifestyle choices will affect the lives of these young adults later on in life (Vella-Zarb & Elgar, 2009, Dinger & Waigandt, 1997). Adolescent weight gain is highly linked to overweight and obesity in adults later on in their adulthood (Guo et al., 2002). This period of emerging adulthood is an important, yet understudied age group for establishing long-term health behavior patterns (Nelson, 2012). College is a time when students can actualize better nutrition and healthy lifestyle choice, but studies show that not much has been done to promote this in college and universities.

Weight Gain in College

Vella-Zarb and Elgar reviewed twenty-four journal articles examining freshman weight gain. Between January 1985 and April 2008 using Ovid MEDLINE, Web of Science, and the PsycINFO databases with the following keywords: 'Freshman 15' and 'Freshman weight gain'. Only studies on weight gain in freshman year were included in the analysis. Studies were excluded if they examined weight change over periods other than the freshman year or beyond the freshman year of college, or had no subset of participants surveyed at the end of the freshman

year. Studies that examined changes in body mass index (BMI) only and not weight change were also excluded from the analysis. In total, 24 studies were included with a total of 3,401 freshmen participants, ~85% of whom were female. The mean duration of the studies was 6.42 months. 17 studies (70.8%) used measured height and weight data, whereas the other 7 studies (29.2%) relied on self-reports. The mean weight gain in the freshman year of college was 3.86 ± 1.63 lbs. Studies that were over longer durations found greater total weight gain. Contrary to the "freshman 15" notion, typical weight gain is closer to 5 lbs rather than to 15 lbs. This is a small, but significant, amount of weight gain (Vella-Zarb & Elgar, 2009).

Racette and colleagues assessed changes in body weight and BMI from the beginning of freshman year to the end of senior year of college. The participants were students at Washington University recruited in their freshman year and followed in their senior year. Recruitment strategies included announcements mailed to students via campus mail or email, flyers posted in freshman residence halls, and verbal communication from residence hall advisors. Data were collected in the first 2 weeks of the first semester of freshman year and the last 2-3 weeks of senior year. 204 (136 female, 66 male) students participated. In the first year, 15% of the students were overweight or obese. During senior year, 23% were overweight or obese. On average, males gained more height (0.9 ± 1.2 cm or 0.35 ± 0.47 in) and weight (4.2 ± 6.4 kg or 9.26 ± 14.11 lb) in 4 years whereas females gained 0.6 ± 0.9 cm (0.24 ± 0.35 inches in height, and 1.7 ± 4.5 kg (3.75 ± 9.92 lbs). The average BMI in freshman year was 22.4 ± 3.4. and in senior year 23.1 ± 3.8. The authors concluded that, although some of the observed weight gain was likely attributable to normal growth and maturation, a portion could have been due to represent adipose tissue gains that may increase health risks if these trends continue throughout adulthood (Racette et al., 2008).

Gropper and colleagues also examined weight changes and diet behaviors among college students from the beginning of freshman year until the end of senior year. The study recruited from the incoming freshman class at Auburn University via email, fliers, and class announcements in introductory courses typically taken by first-year students at the beginning of fall semester of 2007. Freshman volunteers were excluded from participation if they were under 17 years old, older than 19 years of age, pregnant, married, had children, or reported a diagnosed eating disorder. Data were collected within the first 4 weeks in the fall semester of 2007 and in late April of the spring semester of 2011. Participants were asked to answer a questionnaire that contained demographic information at the baseline data collection. At both assessments, height and weight, body composition, and shape were measured. 131 participants completed the study. Their initial weight and BMI were 66.2 ± 16.2 kg (145.7 ± 35.7 lbs) and 22.5 ± 3.3 kg·m^2. Significant ($p < 0.0001$) gains in height 0.6 ± 0.5 cm (0.25 ± 0.20 inches), weight 3.0 ± 5.0 kg (6.7 ± 11.1 lbs), BMI 1.0 ± 1.7 kg·m^2, percent body fat 3.6% ± 3.5%, and absolute fat mass 3.2 ± 3.4 kg (7.0 ± 7.5 lbs) were observed. Initial average BMI for males was 23.5 ± 3.9and 25.7 ± 4.9 in their senior year. Initial BMI for the females was 22.4 ± 4.4 and 23.1 ± 5.1in their senior year. Average body fat percentage for males increased from 11.0 ± 4.9 to 16.3 ± 6.4. Average body fat percentage for females increased from 22.6 ± 6.1 to 25.6 ± 6.6. At the beginning of the freshman year, 18% of the students were overweight obese whereas by the end of the senior year 31% were overweight or obese (Gropper et al., 2012).

Pope and colleagues examined weight gain trajectory of college students from the first semester of freshman year to the spring semester of their senior year. The students were recruited from a group of students participating in an exercise program called “Burn & Earn” in a northeastern university. Anthropometric assessments were completed at the beginning and end of

the students' freshman year in 2011, and also at the end of their senior year 2015. Of the original 117 students, 86 remained in the study. Mean BMI was significantly higher at the end of senior year (24.84 ± 4.46) vs 23.59 ± 4.01 at the beginning of freshman year ($P < .001$). Mean weight was significantly higher at the end of senior year (71.32 kg ± 15.60) vs the beginning of freshman year (66.94 kg ± 14.02; $P < .001$). Mean weight gain was 4.38 kg. The mean height gain was 1 cm for men and 0.85 cm for women. The significant increase in BMI indicated that height increase did not entirely account for the measured weight increase. The number of overweight or obese students increased from 23% to 41%. The largest weight gain was during their freshman year with an average of 2.9 kg. Additionally, only 15% of the students participated in physical activities for 30 minutes of moderate-intensity aerobic activities for at least 5 days per week (Pope et al., 2017).

Factors that Influence Weight Gain, Overweight and Obesity

Block and colleagues conducted a study to determine the ability of their subjects to estimate the caloric content of meals they consumed at fast food restaurants. They interviewed subjects in fast food chain restaurants in Boston and Springfield, MA; Providence, RI; and Hartford, CT. Ten chains with the highest sales in the U.S. were included in the study. Participants were interviewed during or after dinner time. None of the chains in this study had printed nutrition content in the menus. However, they all had nutrition information posted online. A total of 40 restaurants were selected. With a few of the initial 40 replaced by the nearest restaurant of the same chain with respect to the management's refusal of allowing the team to collect data at their location and/or if there was no space outside of the restaurant to interview participants. Data were collected between 5:15 pm and 7:30 pm, from April 2010 through

August 2011. The energy contents of the meals were calculated based on receipts and the nutrition information provided by the restaurant on their websites. Of the self-reported adult weight and height, 65% were overweight or obese. The mean energy content of the meals consumed by the adults was 836 ± 465 kilocalories. About a quarter of the participants underestimated energy content by 500 calories or more. Overall, the adults underestimated their energy intake by about 175 calories (Block et al., 2013). This shows that adults that consume fast meals lack the ability to estimate energy content within the foods.

In a follow-up study, Franckle and co-workers interviewed 1,877 adults in Boston and Springfield, MA; Providence, RI; and Hartford, CT, and asked them to estimate the kilocalorie content of the items they purchased at fast food restaurants, including sugar-sweetened beverages (which were not included in the previous study). Similar to the Block study, the energy content of the meals and beverages purchased was based on customer receipts and the kilocalorie content listed on the restaurants' websites. Beverages were labeled "high calorie" (HCB) if they contained more than 140 calories. 33% of the adult consumers bought HCB with their meals. The adults underestimated their purchases by 175 ± 636 kilocalories. 46% of the adults also purchased a high-calorie side item (containing more than 140 calories). When the meal was accompanied by the purchase of a high-calorie beverage such as a 16 fluid ounce cup of Coca-Cola Classic, the meal's caloric content was significantly underestimated by the adults (Franckle et al., 2016).

Powell and Nguyen's investigation focused on the effect of fast-food and full-service restaurant consumption on total energy intake, dietary indicators, and beverage consumption. For the purpose of this review, we would focus on the relationship between fast-food and full-service restaurant consumption and energy intake, diet quality, and consumption of sugar-sweetened

beverages (SSBs), particularly soda. Children aged 2 to 11 years and adolescents aged 12 to 19 (n=4,699)(years (Dietary recall data from the participants in the NHANES 2003-2004, 2005-2006, and 2007-2008) surveys were used. Two key focus points were developed for whether any food or beverage items from the following sources were consumed: (1) a fast-food restaurant (fast food/pizza) and (2) a full-service restaurant (waiter/ waitress, bar/tavern/lounge, or restaurant with no additional information). Fast food restaurant meal consumption was associated with an increase in total daily energy intake of 126 kilocalories for children and 309 kilocalories for adolescents. Likewise, consuming food from a full-service restaurant was associated with higher energy intake among children (160 kcal) and adolescents (267 kcal). Fast-food and full-service restaurant consumption resulted in higher intakes of SSBs, respectively, + 91g, and + 143g for children and + 162g and + 126g for adolescents. Fast-food and full-service restaurant consumption was associated with an additional 16.2 g and 7.3 g of sugar intake for children and adolescents respectively. Fast-food and full-service restaurant consumption increased total fat intake and saturated fat intake and sodium intake. Results also showed that many of the adolescents did not compensate for the extra energy from the fast food they consumed, which they could have done by reducing their food intake for the rest of the day. Over time, the excess energy intake would result in weight gain if not balanced out by physical activity (Powell & Nguyen, 2013).

Young and colleagues investigated the relationship among the Stages of Motivational Readiness for Change (SMRC) behaviors of community college students with participation in physical activities (PA), perceptions of current exercise habits, their perceived current physical fitness levels, and the proximity of fitness/exercise facilities available to community college students. Participants were recruited in January 2013 from a Midwestern community college

campus. Online questionnaires were sent to participants through email. 655 usable responses were received. 23% were males and 76% were females with a mean age of 31 years (18-76). Over 60% of the participants were overweight or obese (36% obese). Leisure Time physical activity was defined in this study as walking briskly, jogging, cycling, swimming, or any other activity during which breathing rate (or exertion) is at least as intense as these activities outside of the typical work environment. 65% of the students were physically active while the rest reported that they were not physically active. Of the respondents indicating they were not physically active, 89% of them stated they intended to become more physically active in the next 6 months. Of the participants that considered themselves to be active, only 75% were active regularly (minimum of 30 min at least 5 days per week). Only 11% participant engaged in vigorous-intensity cardio/aerobic exercise or sports activities for at least 20 min at least 5 days a week. When participants were asked how often they performed moderate-intensity cardio or exercise/sports activities for at least 30 min, the most frequent response was 2 days (18%). Only 12% of the responders indicated they performed moderate-intensity activities for at least 5 days a week. It is notable that most community college students from this institution did not participate in physical activities adequately and many were overweight or obese (Young et al., 2015).

Serdula's group investigated epidemiologic literature published between 1970 and July 1992 related to childhood and adult obesity and concluded that, for all studies and across all ages, the risk of adult obesity was at least twice as high for obese children as for non-obese children. The risk of adult obesity was greater for children who were obese at older ages. Are overweight or obese as young adults more likely to maintain those weight statuses into adulthood? Serdula found that about a third (26 to 41%) of obese preschool children were obese as adults, and about half (42 to 63%) of obese school-age children were obese as adults (Serdula

et al., 1993). Weight gain during college is fairly common. It is practical for college students to learn to develop ways to maintain their weight during this time.

Eating Patterns of College Students

Judy Driskell and colleagues studied 261 participants to assess and compare the eating and physical activity habits of a group of lower-level and upper-level undergraduate students at a large Midwestern university. The instrument used was developed by 12 healthcare professionals. The two page written questionnaires were completed by 261 students 19 to 25 years of age enrolled in an introductory nutrition course. They found that over 90% of all the participants consumed foods from fast food restaurants 6-8 times per week. Only 57.1% reported eating breakfast regularly. The most influential factor for food choice was convenience (Driskell et al., 2005).

Many students are aware that eating foods with excess fat or fast foods are not the best and avoid purchasing food items high in fat or calories. Mayfield and her colleagues developed a survey instrument aimed to gather information regarding BMI, how frequently respondents' dined in restaurants, attitudes toward eating in restaurants, and types of establishments frequented. They also gathered demographic information to measure the importance of each nutrient in three categories with regard to their influences on menu selections and their impact purchase intention. 745 students were recruited from three Midwest and Northwest regions of the United States who majored in hospitality management or dietetics. 113 surveys were used in the analysis. They found that 43.1% reported eating out at least once weekly, while 31.7% indicated eating out three or more times weekly. Quick-service restaurants (59.3%) and chain restaurants (60.2%) were the most frequently visited. Macronutrients and total calories had the most impact

on purchase intention through ANOVA testing (M = 5.40, F = 12.37), followed by; health claims (M = 5.09, F = 8.54); and specific nutrients (M = 4.87, F = 4.77). Among the 4 categories in macronutrients and total calories, total calories had the overall highest mean rating, 5.97 ± 1.52; followed by trans-fat, 5.59 ± 1.69; saturated fat, 5.51 ± 1.67; and fat, 5.47 ± 1.51. When nutrition information is displayed, purchase intention is influenced significantly. Students avoided foods high in total calories, and fats (Mayfield et al., 2016). This may indicate that the population's nutrition knowledge was not in-depth enough to estimate the calorie content otherwise.

Tam and colleagues conducted their study to analyze food consumption patterns and behaviors as well as energy balance in college students. Three-day food records, a 24-hour food record and one-day physical activity logs were gathered from each of the 100 students from California State University, Los Angeles. The average age was 22.7 ± 8.7 years old and 47% of the participants were Asian. The average number of fruit and vegetable servings per day was 3.15. Overall, Asian students consumed the most fruits and vegetables on average and had the lowest BMI compared to the Hispanics, Black, White and other races. A weak negative correlation ($r = 0.0325$, $P < 0.05$) between fruit and vegetable consumption and BMI was found in the total group; however, this was mostly contributed by female students; and note there were fewer males in the study (M= 28, F= 72). It was clear that the participants in this study had inadequate fruit and vegetable intake and the researchers recommended nutrition education to promote health in the population this sample represented (Tam et al., 2017). Even though dietary related health issues such as chronic diseases do not happen quickly, especially among young adults, the risks are certainly present among this group. It is likely that this population is often overlooked due to their lack of chronic health issues (Tam et al., 2017).

To address chronic disease risk from a behavioral perspective Jeffries and colleagues conducted their study on students from three community college in Minnesota enrolled in the Choosing Healthy Options in College Environments and Settings (CHOICES). The CHOICES study, was a randomized controlled trial designed to prevent unhealthy weight gain in young adults (ages 18-35) attending 2-year community colleges to test the effectiveness of technology-based obesity interventions. The intervention lasted 24 months which consisted of participation in an academic course and a social networking and support website. Data were collected at baseline, and then at 4, 12, and 24 months including demographics, weight-related behaviors, and other psychosocial factors. Indicators to assess the 4 modifiable health-related behaviors were developed from item responses from the CHOICES questionnaire recorded at baseline. The questionnaire asked young adults to recall past-month consumption of alcohol, fast-food consumption, sugar-sweetened beverage (SSB) consumption, past-week breakfast consumption, past-week physical activity, typical weekday and weekend sedentary behavior, and lifetime cigarette smoking at baseline. For this literature review, only baseline data would be discussed, data after interventions are omitted. Half of the sample reported poor diet behaviors such as high fast-food **(**more than once a week**)** intake (50.6% of the participants), high SSB intake (48.8%), and skipping breakfast (48.5%). 24.3% binged on alcohol (defined for women as having more than 4 drinks at one occasion and 5 drinks for men in one sitting) in the last month. High sedentary (Seated watching TV for more than 2 hours a day, seated work computer use for more than 12 hours per week, seated non-work computer use for 3 hours or more per week) behavior related to playing video games or being on the computer for non-work purposes was reported by 70% of young adults. 50% of the sample had high sedentary behavior based on the amount of time they reported spent on the computer for school or work purposes. The researchers believe

that interventions focusing on young adults who pair their newly acquired independence in college with preventive approaches to obesity could lead to health-promoting behavioral patterns, ultimately decreasing the incidence of obesity and chronic disease (Jeffries et al., 2018).

Where do College Students Find Nutrition and Health Information

It is accepted that the Internet is now a major resource for finding health information for college students (Lenhart, 2010, Percheski & Hargittai 2011). Studies show that college students experience difficulties evaluating the quality and credibility of Internet resources. Studies have shown that professionals were not the primary sources of nutrition or health information for college-aged students (Lenhart 2010, Percheski & Hargittai 2011). Many tend to "Google" health-related questions without examining the dependability of the sources (Escoffery et al., 2005, Rennis et al.,2015, Senkowski & Branscum, 2015) or awareness of websites search engines that are paid for specific sources to appear at the top of the search results (Kim et al., 2011).

Escoffery and colleagues chose two southeastern universities in the fall of 2002 and spring of 2003 to determine the Internet use, health-seeking behaviors on the Internet, and attitudes toward the use of the Internet for health information of college students. Teaching assistants distributed the survey in the health education courses. To administer the online survey, they recruited students through advertisements in the college newspaper and fliers. Emails were sent to interested students containing, a description of the study, a login code, and a password to take the survey online. The anonymous questionnaire was administered as an anonymous paper survey in an introductory health education course or online. The questionnaire had 30 questions with items related to how long they have experience using the Internet, their frequency of use,

the number of hours of Internet use per day, accessibility of the Internet, and barriers to using the Internet. The respondents were also asked to report their level of experience with the Internet and use of common Internet activities such as checking emails and instant messaging. The likelihood of using the Internet for health education purposes was also evaluated. Respondents were also asked to rate the importance of certain criteria for health websites identified by the author from surveys and guidelines used in previous studies that assessed 5 quality elements of health websites, including accuracy, utility, credibility, currency of information, and confidentiality of personal information. Respondents who sought health information received more follow up questions. They were asked to indicate how they searched for health-related websites from the Internet, when was the last time they went online to look for health information, what the topic of the information that they were locating from a given list of topics was, and whether they had consulted a doctor regarding the information they found. Respondents were asked how often they sought information. They were also asked about their perceptions of how obtaining health information on the Internet had improved their personal health. The Escoffery group reported that 98.7% of the 743 undergraduate students surveyed used the Internet. 85% used it 6–7 days per week, and 73% obtaining health information on the Internet, most often by using online search engines such as Google. (Escoffery et al., 2005).

To investigate the Internet usage and online activities of teens and young adults, Lenhart and colleagues utilized data from the 2009 Parent-Teen Cell Phone Survey sponsored by the Pew Internet and American Life Project. The survey data were obtained with telephone interviews of a nationally representative sample of 800 teens aged 12 to 17 years-old, their parents living in the continental United States, and 2,253 adults, age 18 and older distributed by Princeton Survey Research Associates International (for results based Internet users N=1,676). The age groups

included 18-29, 30-49, and adults 50 and older. Young adults aged 18 to 29 have the highest percentage of any age group who search for online health information (72%). Additionally, people that have had some college education and college graduates 70% and 91% looked for health information online respectively (Lenhart, 2010).

Dobransky and Hargittai conducted a study of 1,115 first-year students from the University of Illinois to investigate (1) whether there were systematic differences between members of various social groups in seeking different types of health information online, and (2) whether any identified patterns could be explained by indicators of digital inequality, such as differences in online autonomy and skill. In the paper and pencil survey administered in the spring of 2009, it had asked students to provide parental education status, socioeconomic status, ratings of their own health, Internet accessibility, and health/fitness interest on a 4 point scale. The scale measured what sources they used for seeking information about different types of health matters, and whether they had sought out different types of health content over the past year. If they did seek information on such topics, then they were next asked to indicate all the sources of obtained information from among the following options: (a) “Friends or family”; (b) “Medical professional”; (c) “Newspaper, magazine, TV, radio, books (not online)”; (d) “website”; and (e) “Online discussion with people they do not know personally.” It was observed that 81.3% of the respondents searched for treatment content online and 74.9% of the respondents searched for health, lifestyle-related information. The second and third most consulted were friends and family (56.1% for treatment and 47.4% for lifestyle topics), followed by medical professionals (44.6% for treatment and 18% for lifestyle topics). The study identified no significant relationships between health information seeking and socioeconomic status for either treatment or lifestyle information. However, variations in web-use skill were also an

important factor when it involved the use of the Internet for health information. Students who are more knowledgeable about the web are more likely to use it for obtaining health content (Dobransky & Hargittai, 2011).

Percheski and Hargittai's study in 2011 aimed to learn about students' Internet use habits. Over a thousand first year and second university students from a Midwest university were recruited. The survey was administered using paper and pencil in class. The survey included detailed questions about the respondents' Internet uses, experience, the context of use, types of sites visited, online activities, sources of information for a variety of topical areas, recreational activities and social support, and demographic and family background. To collect data on health information-seeking, they used a modified version of the item asked on the General Social Survey (GSS) Information Society Module in 2000. This survey studied how often, in the past year, respondents had consulted the following sources for health information: (a) daily newspaper (paper version); (b) general interest magazine (paper version); (c) special health or medical newsletter or magazine (paper version); (d) a doctor, nurse, or other medical professional; (e) friends; (f) family; (g) radio or television programs; (h) health Web site; and (i) other Web site. For each of these, the options were "not at all," "1 or 2 times," or "3 or more times." In the analysis of the data, the ources were grouped into (1) family and friends (social networks), (2) healthcare professionals, (3) online resources, and (4) traditional media (newspapers, magazines, radio, and television). Researchers reported that 89.5% of the students sought health information from a friend or family member, followed by online for health information (78%), then by information from medical professionals (75.5%). Among those who looked for health information online, diet/nutrition and then fitness/exercise were the most popular topics (Percheski & Hargittai 2011).

Rennis stated that one reason that students do not want to consult with a healthcare professional may be due to the cost, especially for students that do not have insurance coverage (Rennis et al., 2015). Rennis's group conducted a study of 14 community college students and found that some students searched for advice for self-medication while other searches were for nutrition information on topics such as juicing, vitamins, and minerals. When students were asked how they determine the reliability of the online health information, many were vague and uncertain. Generally, they looked for repetition among advice, author credentials, and the use of medical terminology and date of publication to validate the credibility of websites. Students claimed to check the credentials of the author but failed to evaluate the site's domain and sponsor. It did not occur to participants that not all credentials required rigorous academic training in programs from accredited institutions or were licenses issued from state education boards. Adding further to misinformation is the common practice of using medical jargon in opinion pieces for blogs that make the writer sound convincing. Often these opinion pieces/blogs are accompanied by advertisements for products (Rennis et al., 2015). This population may have limited health literacy to begin resulting in limited eHealth literacy. Although they perceived themselves to be experienced with Internet use and able to effectively search for health-related information, limited knowledge and inability to thoroughly interpret and evaluate eHealth information hinder health decision making (Rennis et al., 2015). Since many students seem to be confident in their ability to seek information online but have been shown not to be able to navigate through the Internet for accurate nutrition and health information, there is a need to train or educate freshmen on how to search for information that results in reliable nutrition and health information.

Hasty's group investigated the concordance and discordance of Wikipedia articles found on April 25, 2012, with peer-reviewed sources on the top 10 most costly diseases (Hasty et al., 2014). As identified by the Agency for Healthcare Research and Quality: heart disease, cancer, mental disorders, trauma-related disorders, osteoarthritis, chronic obstructive pulmonary disease/asthma, hypertension, diabetes, back problems, and hyperlipidemia. Each article was first reviewed by 2 independent physicians to identify every statement of fact to be compared with peer-reviewed sources updated in the last 5 years. Each reviewer then reported concordance or discordance between Wikipedia and the peer-reviewed sources. Additionally, two researchers who did not participate in the original review process then compared both reviews of each article for similar assertions as well as dissimilar assertions and tallied the concordance and discordance for each. This study's null hypothesis was that there would be concordance between the Wikipedia article and the peer-reviewed sources ($P>.05$). The alternative hypothesis was that there would be discordance (ie, no concordance) between the Wikipedia article and the peer-reviewed sources ($P<.05$). A McNemar test for correlated proportions was conducted for the assertions that were similar, dissimilar, or both, as assessed by the blinded reviewers. Most of the Wikipedia articles contained many errors when checked against standard peer-reviewed sources. All but the article on concussions were discordant with peer-reviewed sources. In four articles—major depressive disorder, osteoarthritis, chronic obstructive pulmonary disease, and diabetes mellitus—there was a statistically significant discordance between Wikipedia articles and peer-reviewed sources for dissimilar assertions. Wikipedia at that point in time was in error which could have misled readers (Hasty et al., 2014).

Nutrition and Health Literacy among College Students

The 2010 Patient Protection and Affordable Care Act (Title V) defines health literacy as "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions" (Centers for Disease Control and Prevention, 2015). Health literacy involves many different skills. For example, calculating and blood sugar levels, measuring medications, and understanding nutrition labels. Choosing between health plans or comparing prescription drug coverage requires calculating premiums, copays, and deductibles.

Only 12% of the U.S adults had proficient health literacy skills in 2003, in the only national study that examined US adult health literacy- National Assessment of Adult Literacy. In addition to basic literacy skills, health literacy requires knowledge of the sciences and health topics. People with limited health literacy often lack knowledge or believe misinformation about the body as well as the nature and causes of disease. Without this knowledge, they may not understand the relationship between lifestyle factors such as diet and exercise and various health outcomes (White et al., 2006).

Health information can be overwhelming even for persons with advanced literacy skills. Medical science progresses rapidly. What people may have learned about health or biology during their younger years may be outdated. Moreover, health information provided in a stressful or unfamiliar situation is unlikely to be retained (White et al., 2006). Corcoran talked about health literacy components: clinical domain, prevention domain and navigation of the healthcare system domain in her book. The clinical domain encompasses those activities associated with the healthcare provider-patient interaction, clinical encounters, diagnosis and treatment of illness, and medication. Tasks from the clinical domain are filling out a patient information form for an

office visit, understanding dosing instructions for medication, and following a healthcare provider's recommendation for a diagnostic test. The prevention domain encompasses those activities associated with maintaining and improving health, preventing disease, intervening early in emerging health problems, and engaging in self-care and self-management of illness. Examples are following guidelines for age-appropriate preventive health services, identifying signs and symptoms of health problems that should be addressed with a health professional, and understanding how eating and exercise habits decrease risks for developing serious illness. The navigation of the healthcare system domain encompasses those activities related to understanding how the healthcare system works with individual rights and responsibilities. Examples include, understanding what a health insurance plan would and would not pay for, determining eligibility for public insurance or assistance programs, and being able to give informed consent for a healthcare service. (Corcoran, 2013).

In a study done by Kontos and colleagues, the goal was to examine eHealth use by sociodemographic factors, such as race/ethnicity, socioeconomic status, age, and sex. Data for this study were drawn from the National Cancer Institute's 2012 Health Information National Trends Survey (HINTS). HINTS is a nationally representative survey of the US non-institutionalized adult population that collects data on the American public's need for, access to, and use of health-related information. Data used in this study are from HINTS 4 Cycle 1, collected from October 2011 to February 2012 (N=3,959) through mailed questionnaire. Recruitment of sample was a 2-stage stratified sample with addresses selected from a comprehensive United States Postal Service national residential file. Individual respondents were selected for each household in the sample. The final number of samples was 2,358 cases, 40% of which were male and 60% were female. The cases were separated into age groups 18-34, 35-49,

50-64, 65-74 and 75 and older. 11 HINTS variables that were asked of those respondents who reported yes to ever going online to access the Internet or World Wide Web or to send and receive emails (N=2,358). The 11 eHealth tasks are presented in 3 domains relevant to health communication (healthcare, health information-seeking, and user-generated content/sharing). An example of the eHealth items assessed in this study was, "In the past 12 months, have you used the Internet to look for health or medical information for yourself?" (Yes/no). For healthcare related eHealth tasks, the prevalence of usage is generally low, with approximately 18.95% of online US adults reporting ever having engaged in activities such as email providers, 19.29% tracking health information online, and 17.67% buying medicine online. Slightly more people have used the Internet to search for a healthcare provider (38.42%). For health information–seeking tasks, eHealth usage is notably more prevalent. Nearly 80% (79.04%) of online American adults have used the Internet to look for health information for themselves and 57.04% have used the Internet to look for health information for someone else. Approximately 42.98% have used the Internet in the past year to help with diet, weight, or physical activity, but far fewer have used it to download health information to a mobile device (11.70%). Use of social networking sites (SNS) for health is a bit higher, with 16.80% of online Americans saying they have visited sites such as Facebook or LinkedIn to read or share medical topics. The youngest adults surveyed (18-34 years) had more than twice the odds of engaging in online provider searches compared to the oldest group, aged 65 years and older. Adults aged 18-34 (35% years were 3.5 times as likely and adults aged 35-49 (30.1%) years were nearly 2.5 times as likely as those 65 years and older (10.1%) to use the Internet to search for health information. Those with high school degree or less and those with some college were approximately 35% less likely than college graduates to seek health information online. Also, those making less than $20,000 per

year were nearly 50% less likely than those in the highest income category to have used the Internet for this purpose. Both lower education and lower income were predictive of using SNS, such as Facebook, to read about or share medical topics (Kontos et al., 2014).

As mentioned earlier, college students seem to lack the skills needed to find dependable information that meets their nutrition and wellness needs (Ivanitskaya et al., 2006). In 2006, Ivanitskaya's group conducted a study which aimed (1) to measure the proficiency of college-age health information consumers in finding and evaluating electronic health information; (2) to assess their ability to discriminate between peer-reviewed scholarly resources and opinion pieces or sales pitches; and 3) to examine the extent to which they are aware of their level of health information competency. 308 university students from a health professions course completed a 56 item questionnaire based on the Research Readiness Self-Assessment (RRSA) from the Information Literacy Competency Standards for Higher Education, compiled by the Association of College and Research Libraries (Publications & Statistics, 2018, Ivanitskaya et al., 2006). The revised RRSA assessment contains 56 items, including 16 multiple-choice questions and 40 true/false questions. The RRSA instrument was administered online by giving the students an access pass to the questions. This study found that almost half of the respondents had trouble discriminating between primary and secondary sources of information as well as between references to journal articles and other published documents. When presented with questionable websites on nonexistent nutritional supplements, only 50% of respondents were able to correctly identify the website with the most trustworthy features. Less than a quarter of study participants reached the correct conclusion that none of the websites made a good case for taking the nutritional supplements. Most respondents (84%) believed that their research skills were good, very good, or excellent. The students' self-perceptions of skill tended to increase with increasing

level of education. However, self-reported skills were weakly correlated with actual skill level (Ivanitskaya et al., 2006).

Social media is a great platform for nutrition professionals to expand their practice and to reach more individuals whether it is to advertise services or simply network with others. Social media allows everyone, healthcare professionals as well as individuals without any nutrition credentials to communicate broadly and build large audiences. The volume of nutrition and health information online has made it difficult for the public to discern what is accurate, reliable, and science-based. Helm and Jones recommend that nutrition professionals gain social media proficiency skills as well as maintain the Standard of Practice (Helm & Jones, 2016).

Carrotte and colleagues administered a study in 2015 to identify the characteristics that predicted consumption of 3 types of health and fitness related social media content: weight loss/fitness motivation pages (ie, "fitspiration"), detox/cleanse pages, and diet/fitness plan pages among young social media users. 1001 subjects were recruited from the 2015 Sex, Drugs and Rock'n'Roll study (Objectives), developed by Burnet Institute. This was a cross-sectional convenience on a sample of people aged 15 to 29 years living in Victoria, Australia. The survey contained 112 questions which included questions related to self-reported mental health status, drug and alcohol use, smoking habits; social media activities such as "following" or "liking" accounts that focused on fitspiration (fitness inspiration), detox content (cleansing through juicing), and diet/fitness plans. The results showed that over 37% of the participants were interested in fitspiration, detox and diet/fitness plan pages. Participants "like or "follow" at least one type of social media pages were likely to be being female, 15-17 years old, living outside of major cities, having a self-reported eating disorder, having experienced bullying, never used illegal drugs or engage in risky single occasion drinking on a weekly basis, abused detox/laxative

teas or diet pills, and did not have post-high school education. Almost half of all consumers (48.7%) were teenage girls, who were not as educated as the older participants. For those who have not finished schooling may not have the means to decipher between helpful and harmful information. Health and fitness-related social media content messages labeled as "healthy," might actually provide harmful content for the uninformed. It can be difficult to distinguish between helpful and harmful messages (Carrotte et al., 2015). The threat of misleading, erroneous, and potentially harmful advice provided by digital influencers and online sources are certainly present (Hasty et al., 2014, Carrotte et al., 2015).

Hayes's group had conducted a study of 46 undergraduate students from a large southwestern university, to evaluate whether passing an introductory level college nutrition course would help enhance the students' ability to search for nutrition and diet-related information. The subjects were categorized into two groups according to they passed an introductory, college-level nutrition course (nutrition=17, non-nutrition=31). Subjects were asked to answer 6 questions such as "How many calories are in 1 gram of carbohydrates? fats? Protein?" After answering the questions, subjects were asked to rate their performance based on the level of difficulty the questions and how much effort it took to answer the questions on a 10 point scale. Participants were then given the same questions and asked to use any browser on the Internet to search for answers they did not previously know. Participants were instructed how to use the "think out loud" method as they conducted searches. All observations were recorded using the software Camtasia. After using the Internet to search for answers, the participants were then again asked to rate the effort it took to answer the questions and their performance in answering the questions. Before using the Internet, the nutrition group did significantly better for all questions and were more satisfied with their answers than the non-nutrition educated control

group. 71% of the nutrition group was able to answer the question ("How many calories are in 1 gram of carbohydrates? fats? Protein?") correctly while 0% of the control group was able to answer correctly. After using the Internet, both groups had similar average scores. Both groups rated their performance to be better after using the Internet. The authors believe that the similarity in the two group's self-rated performances after using the Internet can be explained by the "Google Effect", where young people believe there is no need to memorize information since the information they need, can be found online (Hayes et al., 2016).

In a study by Senkowski and Branscum in 2015 aimed to determine search strategies that college students used for finding information related to weight control and weight management on the Internet. 31 college students were recruited by word of mouth, flyers, and from active recruitment done within introductory courses taught in the Department of Health and Exercise Science from the University of Oklahoma. The participants were asked to search the Internet for weight management and weight control information. They were given two types of tasks: either (1) find information on a website to answer the question (type 1) or (2) use the information on a website to construct an answer (type 2). For for the type 1 task, the problem given was "Bill wants to lose 1 pound per week. Using the Internet, find out how many fewer calories should he consume per day to achieve his goal." For the type 2 task, respondents were asked, "Calculate the body mass index of a person who is 5′6″ tall and weighs 160 lbs. What does this BMI tell us?" Observations were made using the software Camtasia. The results showed that students mainly used search engines such as Google to find information related to calorie expenditure. When participants were asked to calculate the number of calories burned for a 150-pound woman, walking at 3 miles per hour, for one hour, they were often unable to find answers the question because they misunderstand what the question was asking. One student said she

couldn’t find an accurate answer to this question, because needed to know the distance walked in order to use the calculator she saw online. One question asked students to rate their confidence in their ability to make appropriate weight loss decisions using online information on a scale of 1 (strongly disagree) to 7 (strongly agree). Three-fourths of the students rated their confidence as 4 (26.7%), 5 (33.3%), or 6 (16.7%). This suggested that three fourths of the students felt average or above average in their confidence to make appropriate weight loss decisions using online information. Many students used the top three results from search engines without considering the source of the information. They also seemed to have difficulty understanding terminologies specifically related to weight management and diet which made it difficult for them to navigate through the Internet to answer the questions asked. The authors concluded that the search engine Google was often exclusively accessed and relied heavily upon to help users craft relevant search terms and correct misspellings. Users often times have trouble telling what "credible" information is supposed to be (Senkowski & Branscum, 2015).

In 2011, Kim, Park, and Bozeman aimed to examine health information search and appraisal behaviors among young, heavy users of the Internet. This study was conducted in two parts. In study 1, 11 undergraduate students from the author's’ college, aged 20-22 were recruited from classes whose instructors permitted participant recruitment. The subjects were then instructed to search for a website that they thought was the best source for nutrition information on the preconception of health. Once they found the best website, participants were interviewed for their search process and strategies, and for their evaluation of the website (e.g., content, features, and credibility of the website). In study 2, three maternal health experts were recruited from the faculty in the department of women, children, and family at the author's’ university. The experts were asked to critique the two most popular websites selected by the students in

study 1. The experts were also asked to comment on the content, features, and credibility of the websites. Both parts of the study were audio-taped and transcribed. The results showed that students were often exposed to misinformation and could not evaluate the quality of the websites adequately based on source credibility, message credibility, and design features. Students were unaware that businesses paid money to appear earlier in search results produced by search engines. The student participants rated their ability to navigate the Internet with an average of 6.2 out of a 7 point scale. However they had a low score on their ability to discern good sources of information (3.4/10). Even though college students are experienced Internet users, it does not help them find quality information due to their limited scope of knowledge on specific health topics. It was emphasized that it is critical for young health seekers to have the appropriate skills and prior knowledge to be able to navigate through the Internet to identify quality information (Kim et al., 2011).

Ickes and Cottrell examined health literacy among research I university students, using the Test of Functional Health Literacy in Adults (TOFHLA) developed by Dewalt (Dewalt, 2004). The TOFHLA measured functional literacy by using real-life healthcare materials and assumed that more than classroom reading ability was necessary to understand and negotiate the healthcare system adequately. The TOFHLA assessed 2 main constructs: numeracy and reading comprehension. The 17-item numeracy scale assessed understanding of prescription labels, appointment slips, and glucose monitoring using actual hospital forms and labels for prescription vials. Ten prompts were given, which the participants had to answer quantitatively. The 50-item reading comprehension scale assessed understanding of healthcare texts through 3 reading passages, including instructions for preparation before an upper GI series, Medicaid patient rights and responsibilities, and hospital informed consent agreement. Random courses were

selected among 10 different areas of study within the university. The permission of instructors through email was obtained through email. Emailed letters of support from all faculties permitting their classes to participate were submitted to the IRB. For the classes whose instructors gave permission, the researchers went to each individual classroom to distribute the instrument. 399 total responses were collected. The average health literacy level was 93.83 out of a possible 100. Within this sample, 98.8% of the students in this study had adequate health literacy. Ickes and Cottrell observed that most students had adequate health literacy in this research I university. It is possible that the students were able to perform well on TOFHLA due to having more educated parents or to having better numeracy and reading skills (Ickes & Cottrell, 2010).

Stellefson and her colleagues (2011) summarized and critically evaluated the evidence from the existing research on eHealth literacy levels among college students between the ages of 17 and 26 years attending various 4-year colleges and universities located around the world. The definition of eHealth literacy was based on that of Norman and Skinner in 2006 as the ability of individuals to seek, find, understand, and appraise health information from electronic sources then apply such information to addressing or solving a health problem (Norman & Skinner., 2006). After a systematic review and selection process, 6 articles were from the U.S. and 1 from Finland were thoroughly examined. All studies measured knowledge and/or behaviors related to ability of college students to locate, use, and evaluate eHealth information. Male college students were more likely to use the Internet to buy pharmaceutical products and locate consumer health information whereas female students were more likely to obtain general health and medical related information online. Females used the Internet more for health information and diagnostic purposes while males were more likely to use the Internet for consumer health products and

services. Three studies that investigated where students searched for health information online reported that 67% to 74% of the participants used the Internet to obtain health information (Stellefson et al., 2011).

Norman and Skinner have developed six core skills that combine eHealth literacy with other types of literacy including the following: traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy (Norman & Skinner, 2006). Traditional literacy involves basic literacy skills, such as reading text, understanding written passages, and coherently speaking and writing a language (Tyner, 1998). Health literacy, as defined by the American Medical Association, is a person's capability to "perform basic reading and numerical tasks required to function in the healthcare environment. Patients with adequate health literacy can read, understand, and act on healthcare information" (American Medical Association, 1999). Information literacy, according to the American Library Association, involves a person knowing "how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them" (American Library Association, 1989). Scientific literacy involves an "understanding of the nature, aims, methods, applications, limitations, and politics of creating knowledge in a systematic manner" (Norman & Skinner, 2006). Media literacy involves the ability to critically think about media content, and "enables people to place information in a social and political context and to consider issues such as the marketplace, audience relations, and how media forms in themselves shape the message that gets conveyed" (Norman & Skinner, 2006). According to Norman and Skinner, "computer literacy includes the ability to adapt to new technologies and software and includes both absolute and relative access to eHealth resources" (Norman & Skinner, 2006). eHealth literacy allows health

research findings to be placed in the appropriate context and requires the understanding of the discovery process.

Thus, a variety of competencies are associated with obtaining eHealth information, including the knowledge, skills, abilities, and other attributes necessary. As outlined by Stellefson et al, these competencies include the ability to (1) conduct basic and advanced information searches, (2) apply Boolean operators to limit searches, (3) differentiate between scholarly documents, authoritative sources, periodicals, and primary sources of information, and (4) understand sometimes ambiguous eHealth terminology.

The studies reviewed herein indicated that many college students lack eHealth literacy skills, suggesting that there is significant room for improvement in college students' ability to obtain and evaluate eHealth information.

Expected outcomes include: students' most preferred source of nutrition information would be the Internet. Students would choose convenience as the most important reason for choosing most preferred sources. The students would not rate their most preferred nutrition information sources as the most credible source. Most students would rate their confidence in their ability to look for credible nutrition information as average or above. Students that have passed a college level nutrition course would rank credibility to be the most important reason for choosing their most preferred information sources.

CHAPTER 3

METHODOLOGY

The objectives of this investigation include determining: (1) Find out what nutrition topics interest students the most and how they would want to obtain nutrition information, (2) determine college students' most preferred sources of nutrition information and the reasons for choosing them, (3) how credible they think their own most preferred sources of nutrition information are and (4) how confident are they with their ability to find credible (based on peer-reviewed studies) nutrition information. Institutional review board approval for this examination of Florida State University students was obtained on Feb 27, 2018. In order to answer these research questions, an online survey was distributed through email and advertised via flyers, announcements in classes, and by word of mouth to Florida State University undergraduate and graduate students. Inclusion criteria include: current Florida State University students, who are at least 18 years old. The goal was to reach 4,000 potential respondents in order to collect at least 380 completed surveys for the result to be significant with margin of error of 5% as determined by the Sample-Size Calculator by Qualtrics (Sample Size Calculator, Qualtrics, Provo, UT, 2018).

Participants were asked to answer questions in a one-time survey regarding their age, gender, student status, college athlete status, years in college, pregnancy status, internet/smartphone access, food allergy/intolerance, dietary habits, exercise habits, what nutrition topics they are interested in, where they obtain nutrition information, why they chose those sources, and how credible the participants believe those sources to be. In addition, participants were asked how they prefer to receive nutrition information. The survey included 23 questions and took 10 minutes to complete. Survey questions can be found in Appendix B. The

following questions included free response options: Question 5, “Rank the reasons for choosing your most preferred sources with 1 being the most important and 8 being the least important.” Question 10, “What nutrition topics do you typically search for the most frequently?” Question 11, “What are the barriers you face when you are trying to obtain nutrition information?” Question 12, “Which way(s) would you prefer to receive nutrition advice? Check all that apply.”

Statistical Analysis

The data for this paper was generated using Qualtrics software, Version [insert version] of Qualtrics. Copyright © [2018] Qualtrics. Qualtrics and all other Qualtrics product or service names are registered trademarks or trademarks of Qualtrics, Provo, UT, USA. https://www.qualtrics.com. The data collected through the survey was for the most part descriptive. Data were analyzed using IBM SPSS Statistics 25 software (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp) software to obtain means and standard deviations. The Likert responses regarding the credibility (the trustworthiness of sources and whether the information was supported by peer reviewed research) of sources, the importance of listed reasons for choosing most preferred information sources, and, one’s confidence to find credible nutrition information were analyzed using SPSS to frequencies. Frequencies of how often nutrition topics are searched for, the most popular nutrition topics, barriers faced when searching for nutrition information, preferred ways of receiving nutrition information, the amount of exercise per week, and fruit/vegetable intake were also determined. SPSS was used to obtain the likelihood ratio of completing a nutrition course on the importance of credibility of the source when searching for nutrition information.

CHAPTER 4

RESULTS AND DISCUSSION

Demographics

A total of 293 student participants were included in this study (Table 1). Results from students who were not yet 18 were excluded. Survey results were terminated for those who completed less than half of the surveys. Participants were from a variety of academic backgrounds including students from the Department of Urban and Regional Planning, College of Social Sciences and Public Policy, Askew School of Public Administration & Policy, College of Music, Department of Economics, Department of Sociology, College of Business, Department of History and Department of Chemistry. The study included 24.6% males and 75.1% females. This data did not align with the general Florida State University population. According to the Office of Institutional Research, in 2018, 43.37% of the students were male and 56.63% of the students were female at the time the survey was done. The average age was 21.8 ±3.27 years. Most participants identified as white (66.6%) with 99.0% of the participants having internet access on their phones and in their homes. Seventy three percent of the participants had attended 1-4 years of college, while 26.6% attended 5-7 or more years of college. About 3% of the participants were college athletes (Table 1).

Nutrition Education

The majority of participants had not passed a college nutrition course (93.1%). Only a small portion of the participants had passed a college nutrition course (6.8%) (Figure 11). Participants in this study showed a very weak likelihood ratio (0.528) for ranking credibility as the most important factor when it comes to deciding most preferred sources of nutrition

information and whether one had passed a college-level nutrition course. The majority of the participants believed credibility was the most important factor when it comes to selecting the most preferred sources of nutrition information and that few students have passed a college level nutrition course, the relationship was not significant (Table 3). We hoped that students that had passed a college level nutrition course would value trust worthy information sources more so than those who were not aware of nutrition misinformation issues. However, it seems most students valued the credibility of nutrition information, but were not actively using credible sources of information for their nutrition information needs.

Allergies and Intolerances

17.1% of the participants had food intolerances, 5.5% had food allergies and 4.8% had both (Figure 12). In a study done in University of Michigan, University of Pittsburgh and Ohio State University, only 50.5% of the students with food allergies avoided foods with allergens. Some factors that influenced the adherence of allergen avoidance included: lack of past severe reactions, lack of labeling in campus dining halls, lack of availability of alternative foods, and lack of knowledge. Many students also seemed to not know the difference between allergies vs. intolerances (Karam et al., 2017).

Physical Activity

The most common exercise and workout pattern were 30 minutes-2 hours per week (26.3%), followed by 2 hours-4 hours per week (22.9%) (Figure 14). 2.7% of the participants were college athletes (Figure15). Like previous findings, most students were not physically active (Yahia et al., 2015, Young et al., 2015). Barriers that kept students from exercising

regularly included time, cost, intimidation due to “being not fit enough” or “don’t know enough”, and un desirable facility quality (Martinez et al., 2016). For the purpose of this nutrition focused study, exercise type and intensity was not specified in the survey.

Perception on Nutrition Habits

Forty-three percent of the participants considered their dietary habits to be acceptable while 32.1% of the participants believed that their dietary habits needed improvements. The rest of the students believed that they had healthy dietary habits (24.9%) (Figure 13). The most common fruit and vegetable consumption pattern was 1 cup per day (27.3%). Only 6.5% of the participants consumed 5 cup or more fruits and vegetables per day (Figure 16). Students may perceive their dietary habits to have high quality compared to recommendations. Matthews, Doerr and Dworatzek (2016) evaluated a large Canadian university campus, 61%-83% of students did not know how many servings of fruits and vegetables were recommended daily yet 42%-54% of the participants claim to meet the recommendations (Matthews et al., 2016). The students’ perception of their dietary habits and actual habits were not in agreement.

Preferred Sources of Nutrition Information and the Reasons for Choosing Them

The top three most preferred sources of nutrition information were Social Media (Instagram, Facebook, Pinterest) (12.4%), Medical Doctors (9.4%), and Nutritionists (7.6%) (Figure 1). This is not surprising since social media sites are easily accessible and the information they provided are updated frequently. Traditional news sources often rely on social media to identify breaking news in real time, such as in the case of tweet updates during the 2013 Boston Marathon bombing (Lin et al., 2016). The most important reasons for selecting preferred

sources of nutrition information included: Credibility (50.17%), Convenience (31.7%), and Possible effectiveness (9.6%) (Figure 2). However, prior researches suggest that, students struggle with discerning what constituted credible information (Ivanitskaya et al., 2006, Senkowski & Branscum, 2015).

Perceived Credibility of Preferred Sources of Nutrition Information

Credibility may represent something different to everyone. To some, credibility may mean that the information came from someone that they trust, such as a family member or a close friend. For others, credibility may require support of multiple peer reviewed research studies. Therefore, we presented a second question regarding how often students think the sources were backed by more than one peer reviewed article. The most credible nutrition information sources were shown to be Registered Dietitians (87.7%), Nutritionists (81.9%) and Medical Doctors (77.8%). The least credible sources of nutrition information were Celebrities (34.8%), Social Media (27.9%), and Television (25.3%) (Figure 3). The sources which were considered to be backed by sufficient research all of the time included: Registered Dietitians (63.1%), Nutritionists (58.4%) and Medical Doctors (52.7%). Source that were never backed by sufficient research were Celebrities (34.8%), Social Media (31.4%), Radio Stations (25.9%) (Figure 4). Ideally, the best sources for students to use are sources that provide information that is supported by multiple peer reviewed journals. Sources such as registered dietitians and government nutrition websites and accredited nutrition courses would be considered the best sources out of the 25. The closeness in percentage indicates that students may not know the difference between Dietitians and Nutritionists and would even use them interchangeably. As the Commission on Dietetic Registration stated in 2014 “all registered dietitians are nutritionists, but

not all nutritionists are registered dietitians." Although the general population likely does not know the requirements and laws that regulate the two credentials.

Confidence in Ability to Search for Credible Nutrition Information

When it comes to the students' confidence in their ability to search for credible nutrition information, 90.8% of the participants in this study were at least somewhat confident, 36.2% were confident and 14.3% were very confident (Figure 5). Similarly, previous studies, more than 3/4 of the participants believed they had at least sufficient research skills when it comes to finding health information (Ivanitskaya et al., 2006, Senkowski & Branscum, 2015). Students who are generally confident may not be as receptive to assistance and learning opportunities as others believe they need improvement (Molteni & Chan, 2015). Therefore, student confidence might prevent students from learning good research skills both academically and when it comes to personal wellness.

Nutrition Information Research

Using the Internet to look up health related information has become popular amongst college students (Escoffery et al., 2005, Dobransky & Hargittai, 2011, Stellefson et al., 2011). Nutrition related topics have also been popular topic of research for students in this study. 75.8% of the participants used the Internet to search for nutrition-related information either at least once a week or at least once a month. 82.3% of the participants searched for nutrition related information on the Internet at least once a month (Figure 6). The most frequently searched nutrition topics were Cooking Related (31.1%), weight management related (30.4%), and performance/exercise related (14.3%) (Figure 7).

Influence of Nutrition Utilization

91.1% of the participants have utilized or followed advice from their most preferred sources, which could easily have been a fad diet (Figure 10). In Comier and Hannond's study done on people aged 16-32, almost 2/3rd of participants reported being exposed to fad diets including cleanses, detoxes, commercial diets, pills, smoking, laxatives and vomiting. 1/5 participants reported using a fad diet in the last 12 months. The most exposure originated from social media and the Internet (Cormier & Hammond, 2018).

Barriers and Preferences Related to Information Reception

Students report that they have faced numerous difficulties while on the search for nutrition related information. The most frequently encountered issues included conflicting information (18.8%), accuracy of information (17.6%), and applying information to your personal life (17.3%) (Figure 8). Increasing exposure and improving students' health or information literacy would help eliminate some of these barriers by making it easy for students to recognize outdated, misleading information available to the general public. The most commonly preferred way to receive nutrition information was face to face, either online or in person (34.2%), followed by educational videos (24.0%) (Figure 9). Even though many students seem to prefer direct interactions with experts, many students may choose to not seek information face-to-face due to the possible extra cost that may come with speaking to experts directly (Rennis et al., 2015).

CHAPTER 5

CONCLUSION

This study had several objectives. First, we wanted to know what nutrition topics students were interested in knowing more about and how they would like to receive nutrition information. Secondly, we wanted to determine how credible students thought the many nutrition information sources available were. Credible in this context meant how well was the information source supported by peer reviewed research. The students were then asked to rate their confidence level in being able to find credible nutrition related information. Additionally, we evaluated the degree to which they considered whether passing a college level nutrition class influenced the importance of credibility when doing their nutrition information research. The expected outcomes were as follows: the students' most preferred source of nutrition information was the Internet. To students, convenience was the most important reason for choosing resources. The students did not rate their most preferred nutrition information sources as the most credible source. Most students rated their confidence in their ability to find credible nutrition information as average or better. Lastly, students that had passed a college level nutrition course ranked credibility to be the most important reason for choosing information sources.

The Internet was the most preferred source of nutrition information. The most preferred nutrition source was Social Media such as Instagram, Facebook, and Pinterest, where anyone can have a voice and a group of audience or peers. Posts related to almost any topic can be created and shared by people using the Internet. Credibility was the most important reason for using the Internet to search for nutrition related information; convenience was reported to be the second.

The participants did not think that their most preferred nutrition information source was the most credible source, as predicted. Social Media was rated as one of the least credible

sources of 25 choices provided. Students were aware that the information sources they used most were not the best sources supported by sufficient research. Most participants rated their confidence in their ability to look for credible nutrition information as average or above average, which agrees with previous studies. Most students believed that they had sufficient research skills when it comes to finding health information (Ivanitskaya et al., 2006, Senkowski & Branscum, 2015).

We asked the students whether passing a college level nutrition class influenced the importance of credibility when doing their nutrition information search. Those who had not and those who had passed a college level nutrition course agreed that credibility was the most important factor when choosing nutrition information sources. However, only 6.8% of the respondents had passed a college level nutrition course. Perhaps this is the reason why no significance was found.

Students were interested in nutrition topics related to cooking, weight management and performance/exercise. Most students searched for nutrition related information at least once a week or once a month. Students believed they had the ability to find credible information backed by peer reviewed studies, but in reality students turn to questionable sources for their research. Students mostly used social media-a source that students agreed to be not the most credible as the primary source of nutrition related information. Considering that less than 10% of the students surveyed had passed a nutrition course, more nutrition education and exposure to science based information might help students develop critical thinking and research skills needed to differentiate credible nutrition information from nutrition misinformation.

Finally, this research determined how students would like to receive nutrition information. Students would prefer individual, face-to-face interactions with nutrition

professionals. However, students often do not get to meet with nutrition professionals individually due to cost and time constraints (Rennis et al., 2015). At Florida State University, the Center for Health and Wellness is available to students for free as part of student services. Perhaps a social media approach to broadcasting trustworthy nutrition information could be developed to increase student knowledge.

This study had many limitations. Participants in this study were from a single university, which does not represent the college student population on a state, regional or national level. About 75% of the participants identified themselves as female, which did not match the actual student demographic of the university. This study could have been split into two different studies, one covering health literacy and the other covering nutritional behaviors.

Some of the questions in the survey, such as the question regarding how long students exercise in a week, did not contribute to the overall objective of this study. The question asking, "What nutrition topics do you typically search for the most frequently?" allowed a free response option. Due to the variation in responses, organizing and analyzing these data was difficult. However, this may be a good question for a focus group type study.

Future research might look into the intersection of online information seeking and the use of ***e***-interventions. Many universities have implemented ***e***-interventions in attempt to reduce alcohol misuse or abuse (Carey et al., 2010). Delivering interventions through electronic means have been well received by students since they are compatible with many devices, are less time consuming, and cost less. Using ***e*** -interventions have reduced alcohol abuse among college students (Donovan et al., 2015, Afshin et al., 2016, Prosser et al., 2018), a few online nutrition interventions have already been shown to improve dairy, fruit and vegetable intake (Brown et al., 2011, Poddar et al.,2012). Some universities require students to pass their alcohol safety course

before the end of the first semester of being in college before they can sign up for more classes. It would be interesting to see a nutrition section regarding basic nutrition information, and nutrition information literacy, similarly constructed as the alcohol safety courses. Services such as live chats and online appointments with nutrition professionals would also be appealing to students. A study that explored the preferences between bariatric patients and dietitians showed that patients preferred to interact with dietitians through traditional methods and using mobile messaging or emails to communicate (Elvin et al., 2017). Interventions such as these might ensure that students receive credible and personalized information with easier access.

Table 1. Demographic Information.

Variable	n=293
Age (in years)	21.8 ± 3.3
18	17(5.8%)
19	49(16.7%)
20	69(23.6%)
21	50(17.1%)
22	25(8.5%)
23-29	66(22.5%)
29+	17(5.8%)
Race	
Asian/Pacific Islander	19(6.5%)
Black/African American	21(7.2%)
Hispanic/Latino(a)	47(16.0%)
Native American/American Indian	0.00%
Native Hawaiian or other Pacific Islander	1(0.3%)
Prefer not to Answer	10(3.4%)
White	195(66.6%)
Years of College Attended	3.4 ± 1.9
1	50(17.1%)
2	63(21.5%)
3	68(23.2%)
4	34(11.6%)
5	27(9.2%)
6	18(6.1%)
7+	33(11.3%)
Gender	
Male	72(24.6%)
Female	220(75.1%)
Other	1(0.3%)

Table 1. Continued

Access to Internet on Smartphone/at Home	
Yes	290(99.0%)
No	0.00%
Smartphone Only	1(0.3%)
At Home Only	2(0.7%)
College Athlete	
Yes	8(2.7%)
No	263(89.8%)
No, but are training regularly	22(7.5%)

Table 2. Credibility Importance Ranking When it Comes to Choosing Most Preferred Nutrition Information Sources * Passed a College Accredited Nutrition Course Cross-tabulation

			Have you passed an accredited nutrition course		
			Yes	No	Total
Credibility importance ranking when it comes to choosing sources	1	Count	14	136	150
	2	Count	2	43	45
	3	Count	2	37	39
	4	Count	1	23	24
	5	Count	0	17	17
	6	Count	1	9	10
	7	Count	0	6	6
	8	Count	0	2	2
Total		Count	20	273	293

Table 3. Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.165a	7	0.761
Likelihood Ratio	6.103	7	0.528
Linear-by-Linear Association	1.766	1	0.184
N of Valid Cases	293		

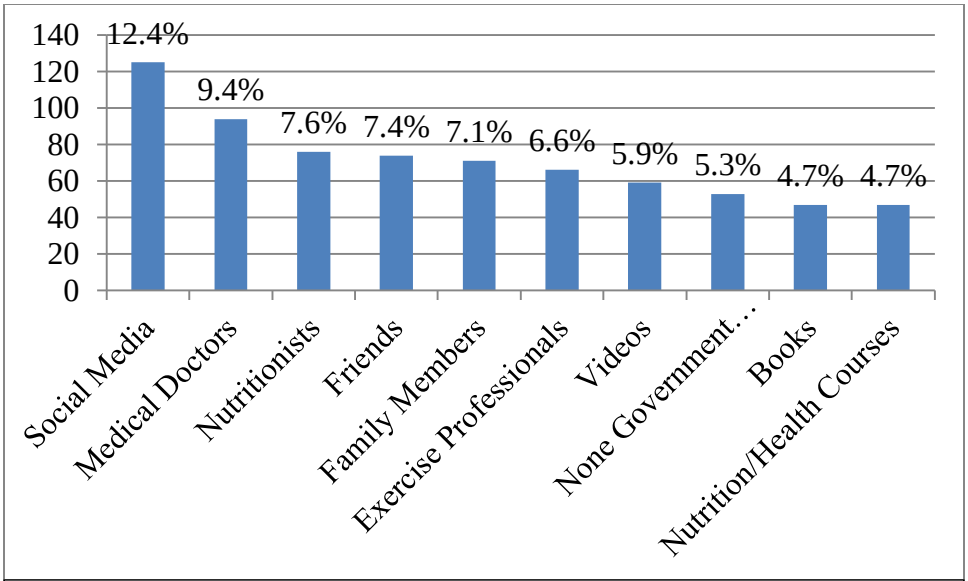

Figure 1. Most Preferred Sources of Nutrition-Related.

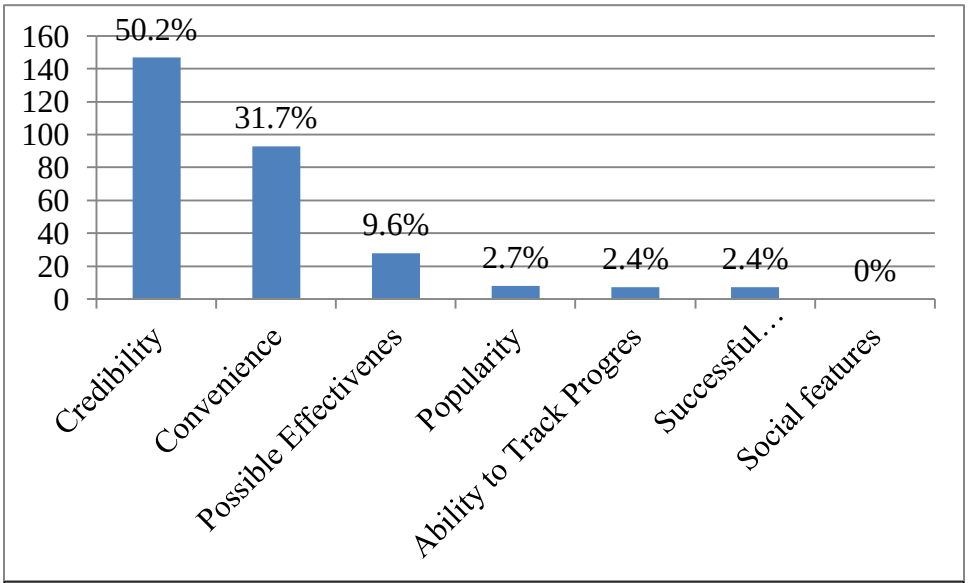

Figure 2. Reasons for Choosing Most Preferred Sources.

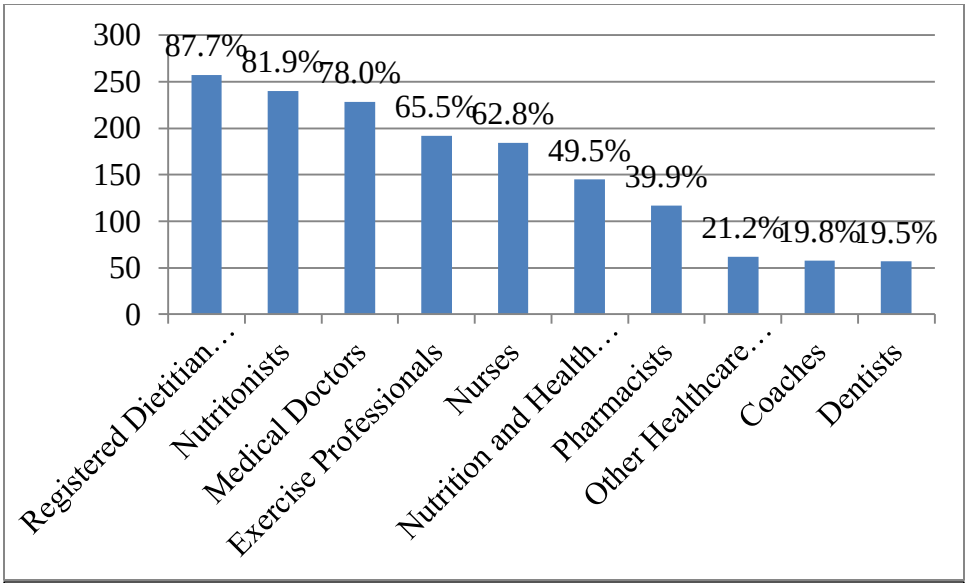

Figure 3. Top Ten Most Credible Source.

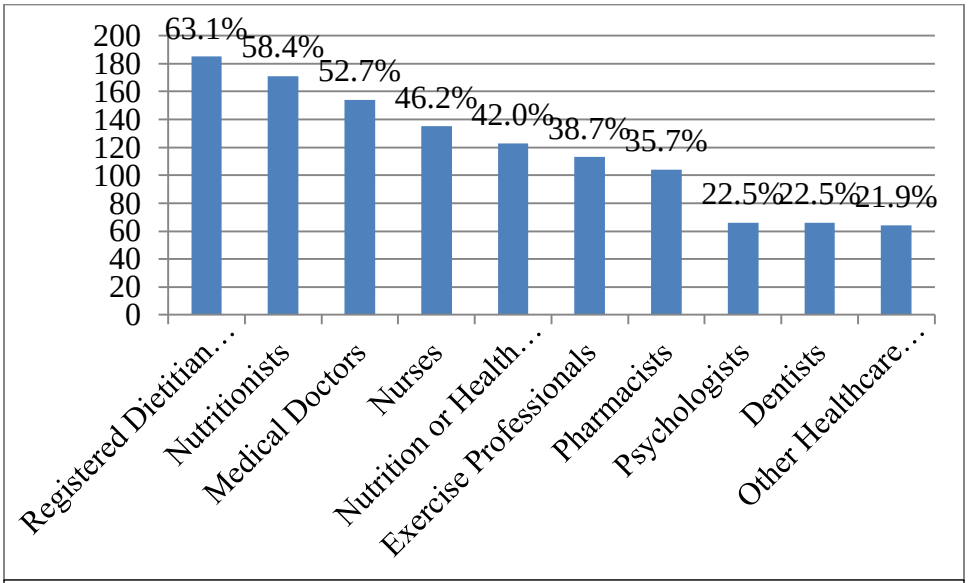

Figure 4. Top Ten Sources Backed Up by More Than One Peer-Reviewed Study.

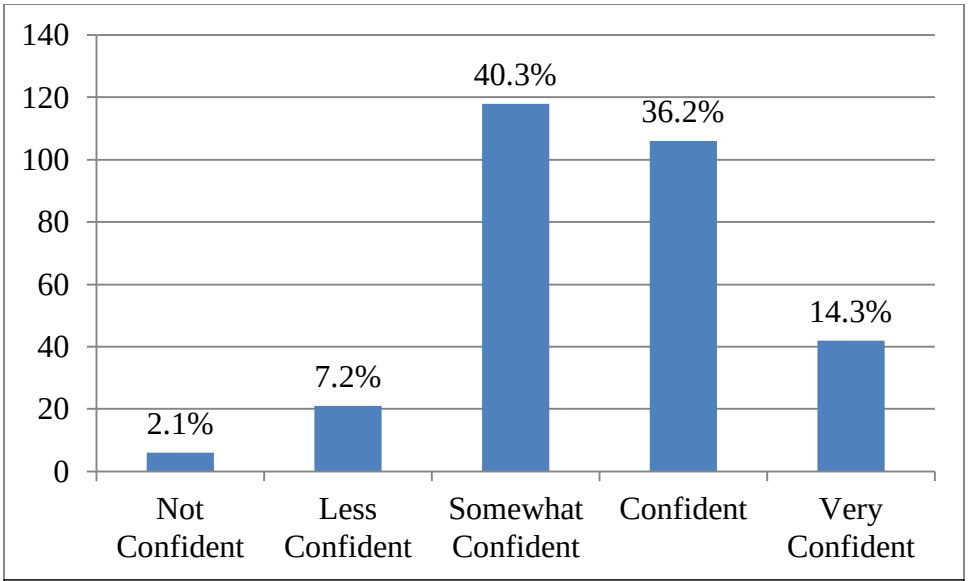

Figure 5. Confidence in Ability to Find Credible Nutrition.

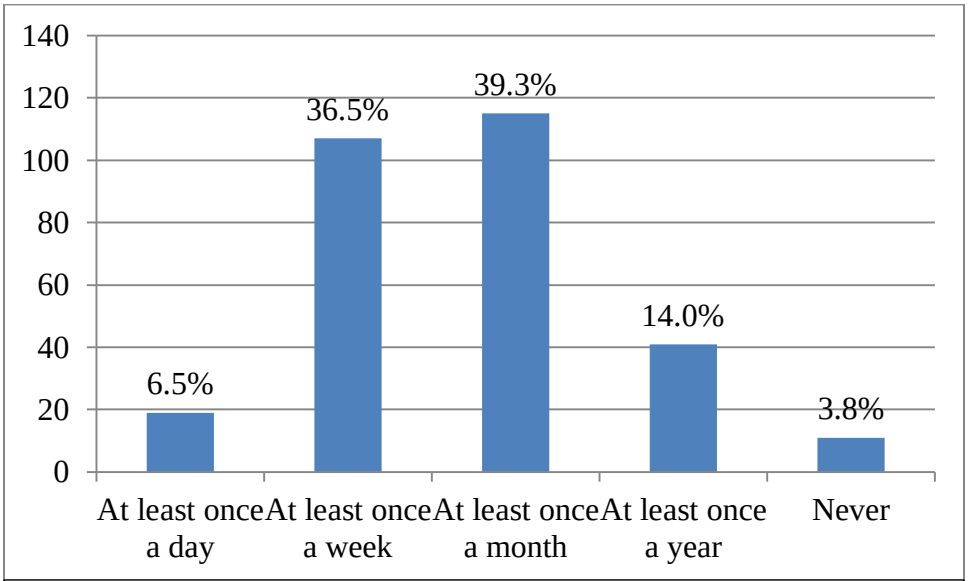

Figure 6. Frequency of Using the Internet to Look up Nutrition-Related Information.

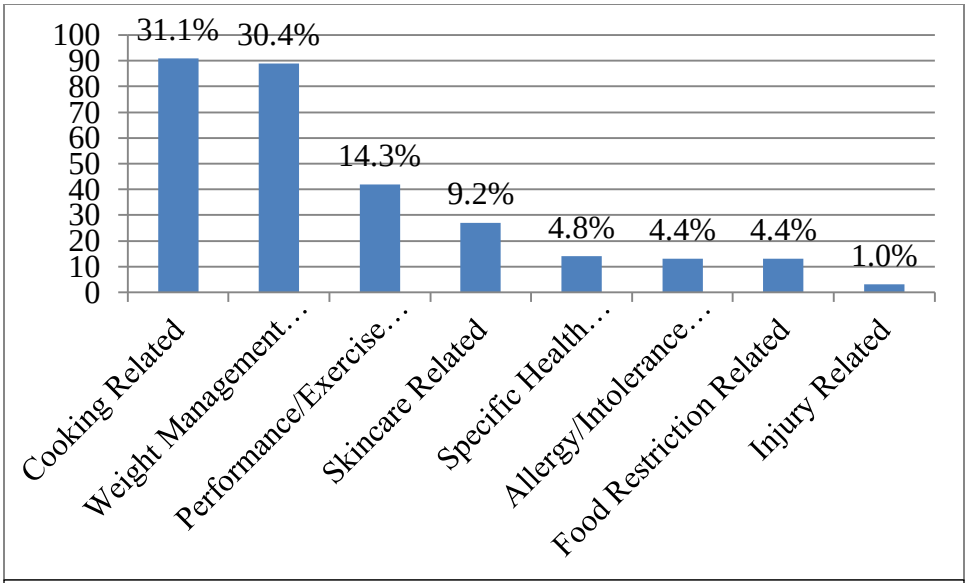

Figure 7. Nutrition Topic Search Frequency.

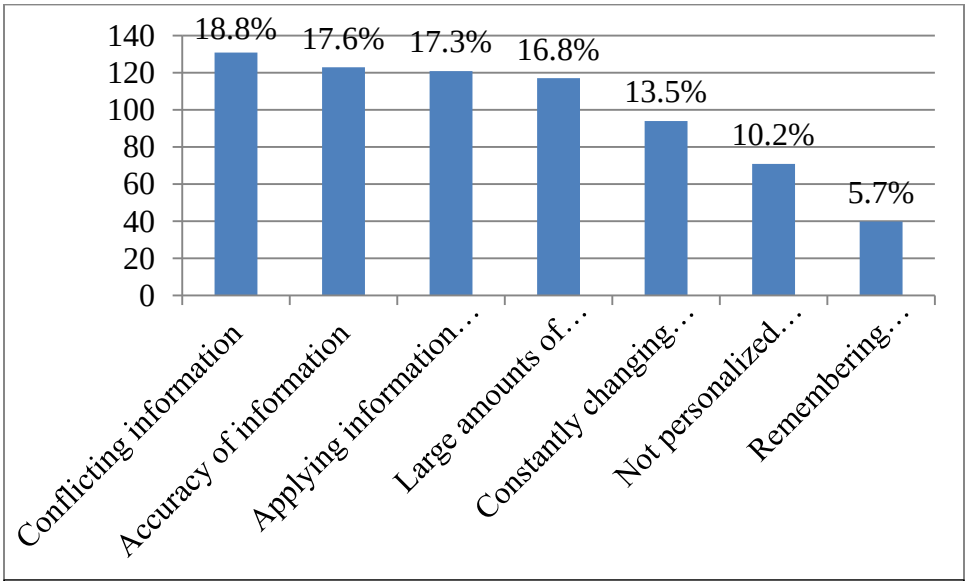

Figure 8. Barriers for Researching for Nutrition Information.

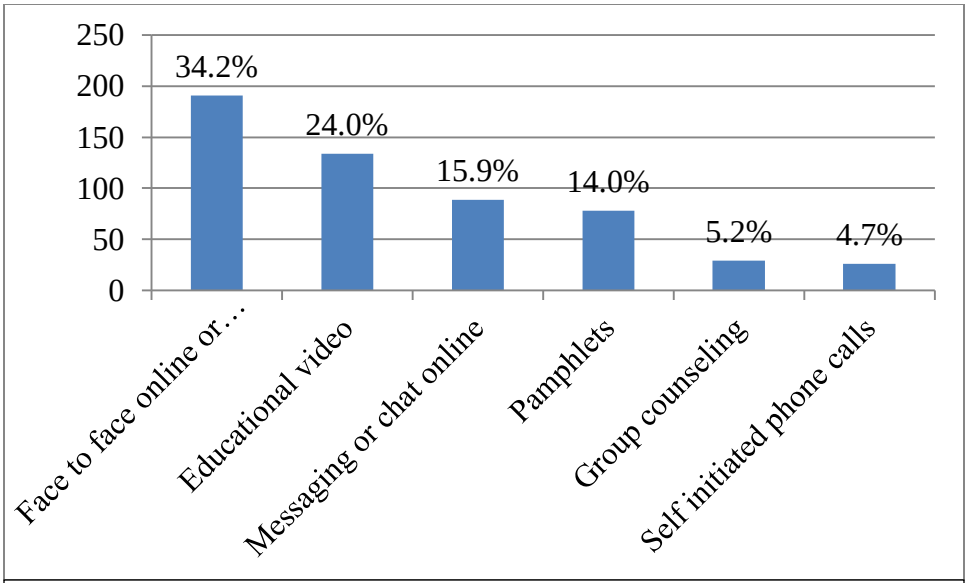

Figure 9. Preferred Methods of Receiving Nutrition Related Information.

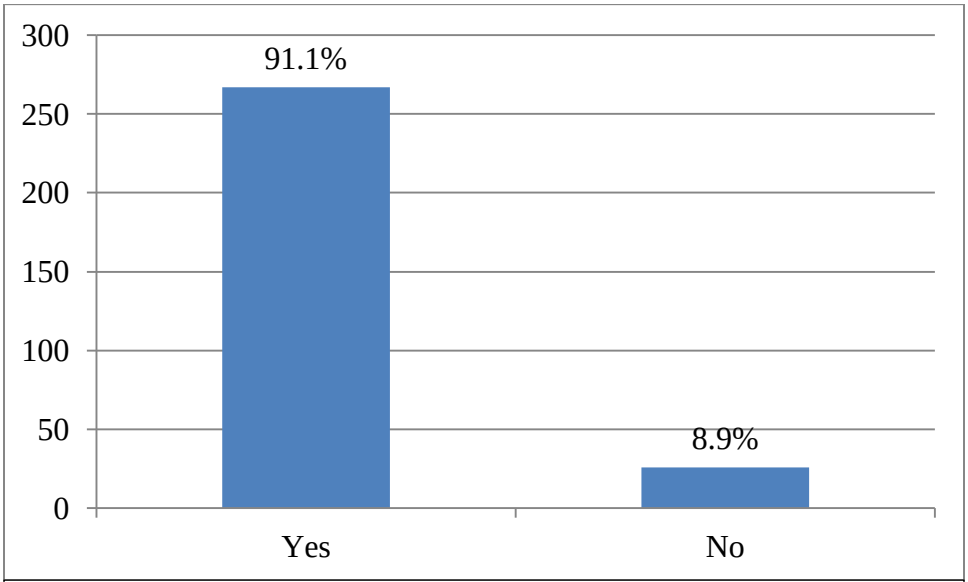

Figure 10. Utilization of Information from Most Preferred Sources.

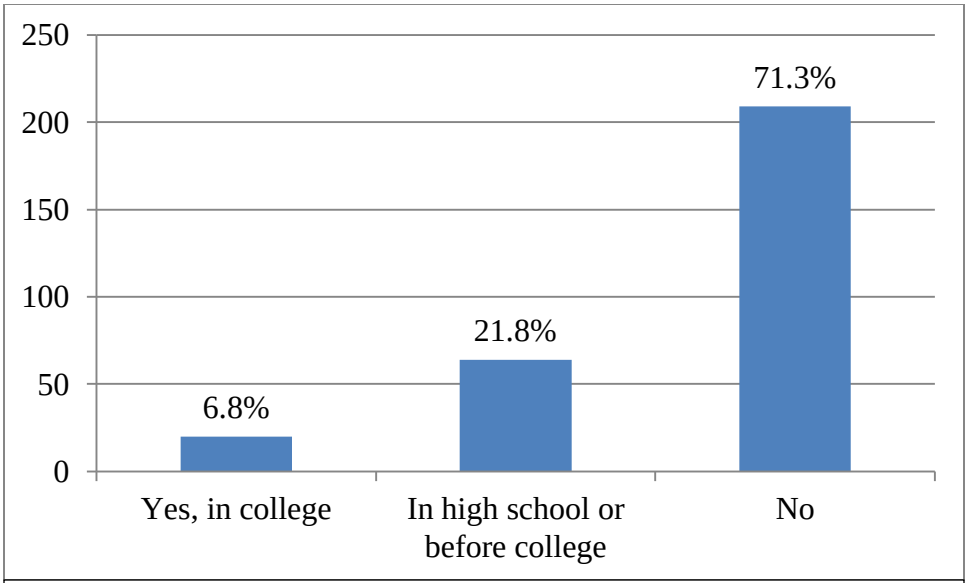

Figure 11. Passed a Nutrition Course.

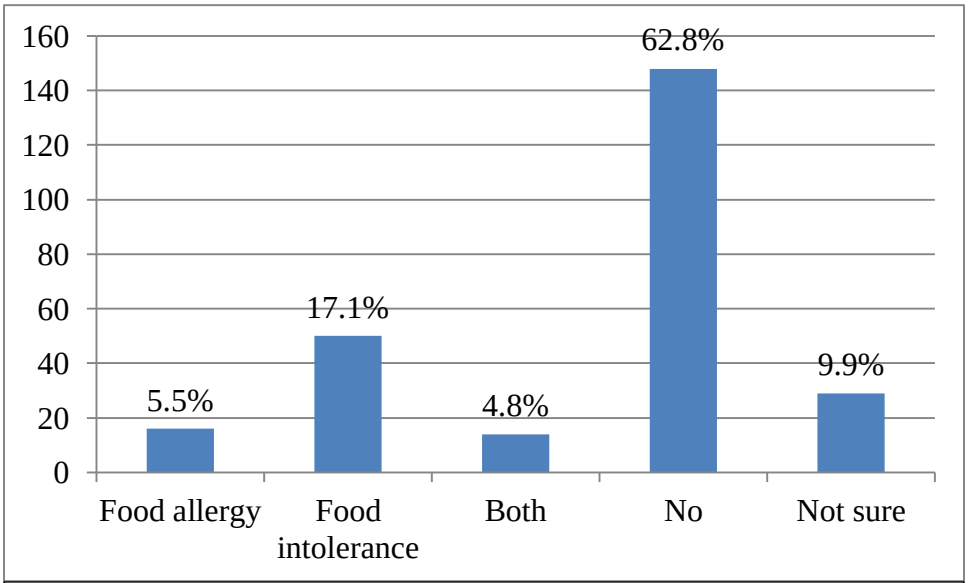

Figure 12. Food Allergy/Intolerance.

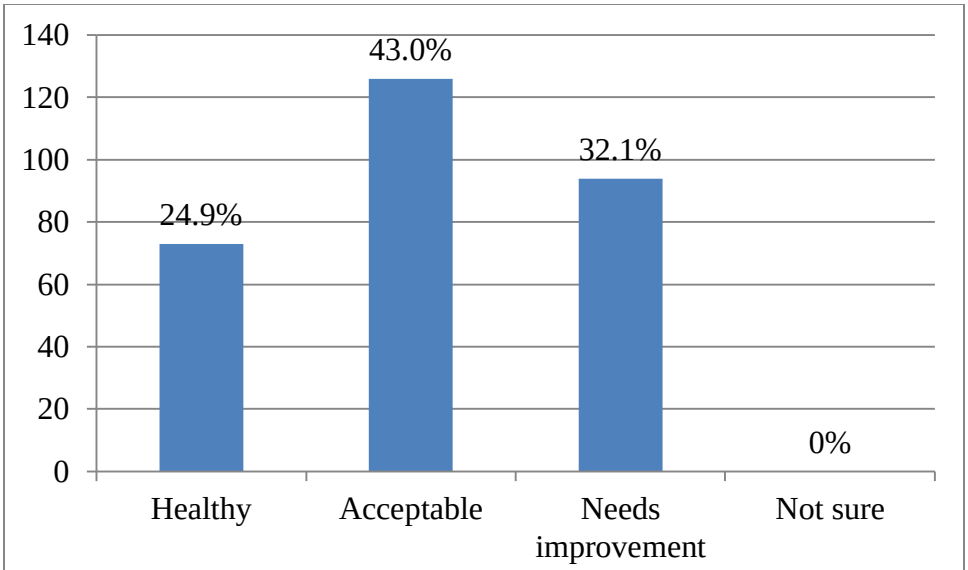

Figure 13. Satisfactions with Dietary Practices.

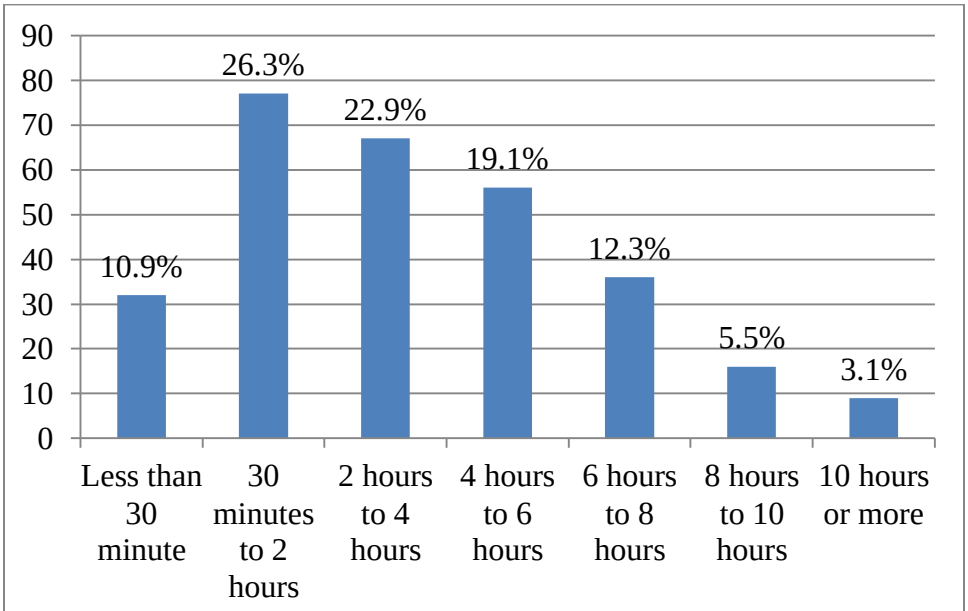

Figure 14. Exercise Pattern in 7 Days.

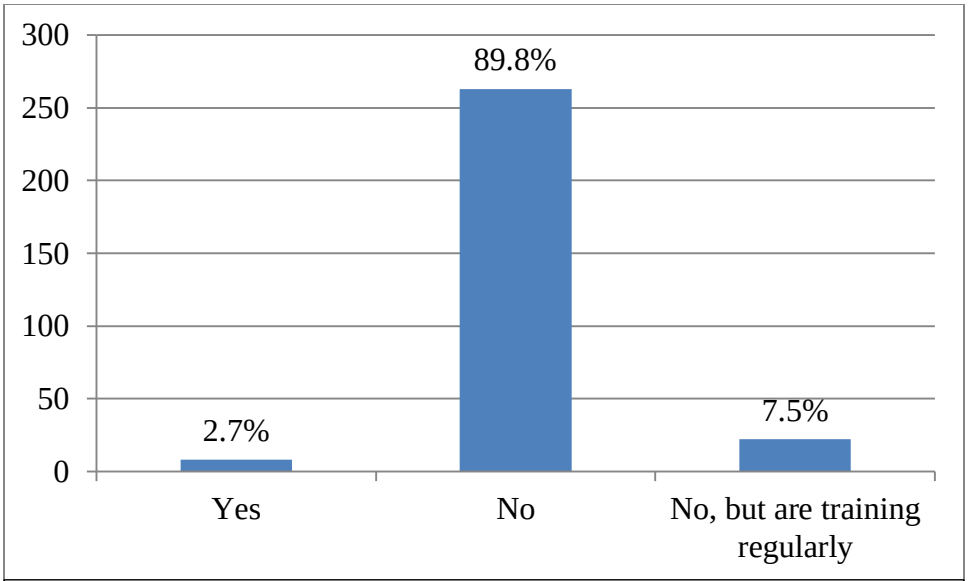

Figure 15. College Athlete.

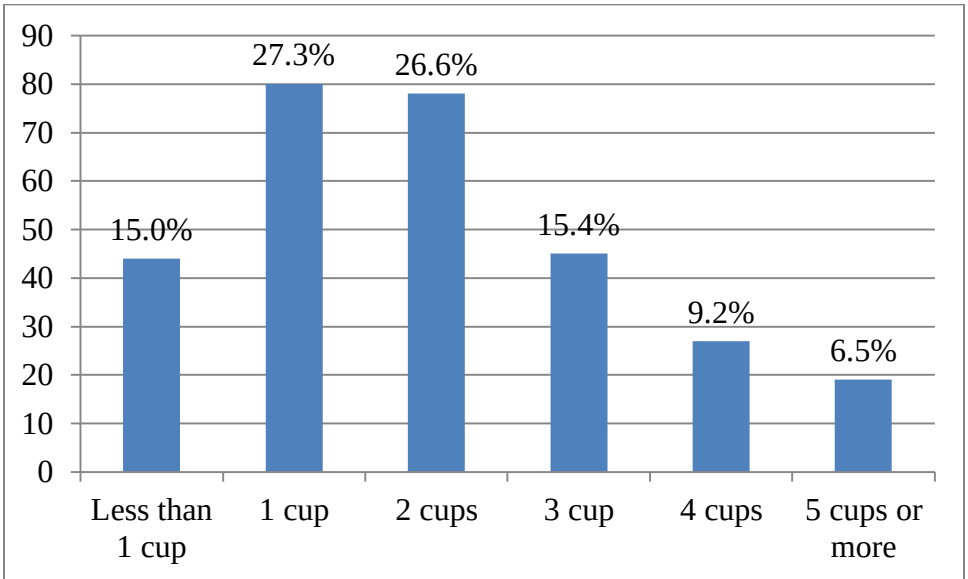

Figure 16. Fruit and Vegetable Consumption.

APPENDIX A

FORMAL IRB APPROVAL LETTER

Florida State
UNIVERSITY

Office of the Vice President For Research
Human Subjects Committee
P O Box 3062742
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM (for change in research protocol)

Date: 05/29/2018

To: Anni Liu [redacted]

Address: [redacted]

Dept: NUTRITION FOOD AND EXERCISE SCIENCES

From: Thomas L. Jacobson, Chair

Re: Use of Human subjects in Research
Project entitled: University Students' Nutrition Interests, Preferred Information Sources, and Their Perceived Credibility

The application that you submitted to this office in regard to the requested change/amendment to your research protocol for the above-referenced project has been reviewed and approved.

Please be reminded that if the project has not been completed by 02/26/2019 , you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc:
HSC NO. 2018.25018

Florida State
UNIVERSITY

Office of the Vice President for Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 11/28/2018

To: Anni Liu [redacted]

Address: [redacted]

Dept.: NUTRITION FOOD AND EXERCISE SCIENCES

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
University Students' Nutrition Interests, Preferred Information Sources, and Their Perceived Credibility

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 02/26/2019 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Maria Spicer [redacted], Advisor
HSC No. 2017.22048

Florida State
UNIVERSITY

Office of the Vice President For Research
Human Subjects Committee
P. O. Box 3062742
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

RE-APPROVAL MEMORANDUM

Date: 01/03/2019

To: Anni Liu [redacted]

Address: [redacted]

Dept.: NUTRITION FOOD AND EXERCISE SCIENCES

From: Thomas L. Jacobson, Chair

Re: Re-approval of Use of Human subjects in Research:
University Students' Nutrition Interests, Preferred Information Sources, and Their Perceived Credibility

Your request to continue the research project listed above involving human subjects has been approved by the Human Subjects Committee. If your project has not been completed by 01/01/2020 , you are must request renewed approval by the Committee.

If you submitted a proposed consent form with your renewal request, the approved stamped consent form is attached to this re-approval notice. Only the stamped version of the consent form may be used in recruiting of research subjects. You are reminded that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report in writing, any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chairman of your department and/or your major professor are reminded of their responsibility for being informed concerning research projects involving human subjects in their department. They are advised to review the protocols as often as necessary to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

Cc:
HSC No. 2018.26467

APPENDIX B

SURVEY FLOW AND QUESTIONS

Where do FSU Students Find Nutrition Information: What, Why and How?

Survey Flow
Branch: New Branch
If
If Consent Form This survey will take about 10 minutes of your time. Completing this survey will h... Yes Is Selected
Block: Default Question Block (23 Questions)
Block: Default Question Block (23 Questions)
Branch: New Branch
If
If Consent Form This survey will take about 10 minutes of your time. Completing this survey will h... Yes Is Not Selected
EndSurvey:
Branch: New Branch
If
If If you would like to be entered for the $50 gift card raffle, please enter your email address below. Yes, Please! Is Displayed
EndSurvey:

Page Break

Start of Block: Default Question Block

Q1 Consent Form
This survey will take about 10 minutes of your time. Completing this survey will help us learn how college students access nutrition information and develop ways to satisfy their nutrition knowledge needs. With your permission, you will be entered into a raffle for a $50 dollar gift card of your choice. You must answer all the questions within the survey in order to be eligible for the raffle. We will request your email if you choose to participate in the gift card raffle. This survey includes questions regarding your age, gender, pregnancy status, Internet usage/ access, diet/exercise habits, and preferred nutrition source and will remain anonymous. If you have any questions or concerns regarding this survey, please contact Anni Liu at. If you have questions regarding your rights as a participant, please contact IRB Human Subjects Office at 2010 Levy Avenue Suite 276

Tallahassee FL, 32306-2742
Ph: (850) 644-7900
Fax: (850) 644-4392
jth5898@fsu.edu I freely and voluntarily without any element of force or coercion, consent to participate in this University Students' Nutrition Interests, Preferred Information Sources, and Their Perceived Credibility Survey. I am hoping that this study will help health

professionals with the student's nutrition needs, as well as to learn about nutrition misinformation and attempt to limit it in the future through education. This research is being conducted by Anni Liu, a graduate student in the Nutrition, Food and Exercise Sciences Department of the College of Human Sciences at Florida State University. This research work is being supervised by Dr. Maria Spicer, Ph.D., RDN, professor, and Dietetics Internship Director. I understand that my responses are anonymous, will be kept strictly confidential and that there is no risk involved with participating in this study. I have read and understood this consent form. I consent to participate in this survey. If not, please select no.

O Yes (1)

O No (2)

Skip To: End of Survey If Q1 = No
Skip To: Q3 If Q1 = Yes

Q2 Are you currently an FSU student that is at least 18 years old?

O Yes (1)

O No (2)

Skip To: Q1 If Q2 = Yes
Skip To: End of Survey If Q2 = No

Q3 How often do you use the Internet to look up nutrition-related topics?

O At least once a day (1)

O At least once a week (2)

O At least once a month (3)

O At least once a year (4)

O Never (5)

Q4 What are your top three most preferred source(s) of nutrition-related information? Choose three.

☐ Coaches (1)

☐ Friends (2)

☐ Family Members (3)

☐ Celebrities (4)

☐ Health/Supplement Store Clerks (5)

☐ Medical Doctors (6)

☐ Nurses (7)

☐ Exercise Professionals (8)

☐ Pharmacists (9)

☐ Registered Dietitian Nutritionists (10)

☐ Nutritionists (11)

☐ Dentists (12)

☐ Psychologists (13)

☐ Other Health Professionals (14)

☐ Social Media (Instagram, Facebook, Pinterest) (15)

☐ Applications (16)

☐ Videos (17)

☐ Government Websites (18)

☐ None Government Websites (19)

☐ Radio Stations (20)

☐ Television (21)

☐ Magazines (22)

☐ Books (23)

☐ Accredited Courses (24)

☐ Other (25)

Q5 Rank the reasons for choosing your most preferred sources with 1 being the most important and 8 being the least important.

_____ Convenience (1)

_____ Credibility (Credible is defined as information that can be backed up by research in more than one study.) (2)

_____ Popularity (3)

_____ Social features (Such as support groups) (4)
_____ Ability to track progress (5)
_____ Successful advertisement (6)
_____ Possible effectiveness (7)
_____ Other, please explain (8)

Q6 How credible/reliable do you consider the following sources to be? Credible is defined as information that can be backed up by research in more than one study.

	Not Credible (1)	Probable (2)	Neutral (3)	Somewhat Credible (4)	Very Credible (5)
Coaches (1)	O	O	O	O	O
Friends (2)	O	O	O	O	O
Family Members (3)	O	O	O	O	O
Celebrities (4)	O	O	O	O	O
Health Store Clerks (5)	O	O	O	O	O
Medical Doctors (6)	O	O	O	O	O
Nurses (7)	O	O	O	O	O
Exercise Professionals (8)	O	O	O	O	O
Pharmacists (9)	O	O	O	O	O

Registered Dietitian Nutritionists (10)	O	O	O	O	O
Nutritionists (11)	O	O	O	O	O
Dentists (12)	O	O	O	O	O
Psychologists (13)	O	O	O	O	O
Other Health Professionals (14)	O	O	O	O	O
Social Media (15)	O	O	O	O	O
Applications (Apps) (16)	O	O	O	O	O
Videos (17)	O	O	O	O	O
Government Websites (18)	O	O	O	O	O
Non-Government Websites (19)	O	O	O	O	O
Radio Stations (20)	O	O	O	O	O
Television (21)	O	O	O	O	O

Magazines (22)	O	O	O	O	O
Books (23)	O	O	O	O	O
Accredited Courses (24)	O	O	O	O	O

Q 8 Have you utilized/followed advice from your most preferred sources?

O Yes (1)

O No (2)

Q9 How confident are you with your ability to find credible nutrition information?

	Not Confident (1)	Less Confident (2)	Somewhat Confident (3)	Confident (4)	Very Confident (5)
Ability to find credible nutrition information (1)	O	O	O	O	O

Q10 What nutrition topics do you typically search for the most frequently?

O Allergy/Intolerance Related (1)

O Cooking Related (2)

O Food Restriction Related (3)

O Injury Related (4)

O Performance/Exercise Related (5)

O Skin Care Related (6)

O Specific Health Condition Related (7)

O Weight Management Related (8)

O Other, please explain (9) _____

Q11 What are the barriers you face when you are trying to obtain nutrition information?

☐ Conflicting information (1)

☐ Large amounts of information to process (2)

☐ Constantly changing information (3)

☐ Remembering information (4)

☐ Applying information to your personal life (5)

☐ Accuracy of information (6)

☐ Not personalized enough information (7)

☐ Other (8) _____

Q12 Which way(s) would you prefer to receive nutrition advice? Check all that apply.

☐ Face to face online or in person (1)

☐ Self-initiated phone calls (3)

☐ Messaging or chat online (4)

☐ Pamphlets (5)

☐ Educational video (6)

☐ Group counseling (7)

☐ Other, please explain (8) _____

Q13 Have you passed an accredited nutrition course?

O Yes, in high school or before college (1)

O Yes, in college (2)

O No (3)

Q14 Do you have any food allergies or food intolerances?

O Food allergy (1)

O Food intolerance (2)

O Both (3)

O No (5)

O Not sure (4)

Q15 How do you view your own dietary habits?

O Healthy (1)

O Acceptable (2)

O Needs Improvement (3)

O Not Sure (4)

Q12 Are you an undergraduate student or graduate student?

O Undergraduate (1)

O Graduate (2)

O Other (3)

Q16 How many hours do you exercise/work out in 7 days?

O Less than 30 minutes (1)

O 30 minutes to 2 hour (2)

O 2 hour to 4 hours (3)

O 4 hours to 6 hours (4)

O 6 hours to 8 hours (5)

O 8 hours to 10 hours (6)

O 10 hours or more (7)

Q17 How many cups of fruits or vegetables do you consume per day on average?

O Less than one cup (4)

O One cup (2)

O Two cups (6)

O Three cups (7)

O Four cups (8)

O Five cups or more (9)

Q18 This is your _____ year in college.

O 1st (1)

O 2nd (2)

O 3rd (3)

O 4th (4)

O 5th (5)

O 6th (6)

O 7th or more (7)

Q19 Do you have access to the Internet on your smartphone and at home?

O Yes (1)

O No (2)

O Smartphone only (3)

O At home only (4)

Q20 What do you consider your race to be?

O Asian (1)

O Black/African American (2)

O Hispanic/Latino(a) (3)

O Native American/American Indian (4)

O Native Hawaiian or other Pacific Islander (5)

O White (6)

O Prefer not to answer (7)

Q21 Are you a college athlete?

O Yes (1)

O No (2)

O No, but are training regularly (3)

Q22 What is your gender?

O Male (1)

O Female (2)

O Other (3)

Q23 What is your age?

O 18 (1)

O 19 (2)

O 20 (3)

O 21 (4)

O 22 (5)

O 23 (6)

O 24 (7)

O 25 (8)

O 26 (9)

O 27 (10)

O 28 (11)

O 29 (12)

O Over 29 (13)

O Prefer not to say (14)

End of Block: Default Question Block

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POSITION TITLE: Nutrition and Dietetics Masters' Student

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
Florida State University	BS	05/2014	12/2016	Dietetics
Florida State University	MS	01/2017	05/2019	Nutrition and Food Science

A. Personal Statement

My long term interest is to be able to help the public through nutrition. Whether through research or working, the goal is to be able to deliver what I know to others so they too can benefit from something as simple as eating. Currently I work as a research assistant in Florida Department of Elder Affairs and I am hoping to learn more about the practical use and implementation of nutrition programs in the real world. Working with programs such as SNAP, Adult Care Food Programs in registered adult day cares and Senior Farmers Market provided me with the opportunity to see the process of words on policies to adults getting fed almost every step of the

way. At the same time, I have been working on my thesis in an attempt to learn about how college students obtain nutrition information and the challenges they face when they search for nutrition related information.

B. Positions and Honors

2017- Present Research Assistant at Florida Department of Elder Affairs
2017- 2017 Intern at Florida Department of Elder Affairs
2013- 2014 Student Assistant at Chemical & Biomedical Engineering Department
2014- Present Member of Omicron Pi, Kappa Omicron Nu
2015- 2016 Secretary of College Leadership Council of FSU College of Human Sciences

C. Contributions to Science
None so far.

D. Additional Information: Research Support and/or Scholastic Performance

YEAR	COURSE TITLE	GRADE
2015	Medical Nutrition Therapy I	A-
2015	Community Nutrition	B+
2015	Foods	A-
2015	Foods Lab	A
2015	Food Economics	B+
2015	Metabolism I	B
2015	Life Cycle Nutrition	B
2015	Metabolism II	B
2016	Medical Nutrition Therapy II	B
2016	Medical Nutrition Therapy II Lab	A-

2016	Food Service Management	A-
2016	Food and Society	A
2017	Seminar Food/Nutrition	A
2017	Seminar Food/Nutrition	S
2017	Carbs/Fats/Proteins	B
2017	Vitamins and Minerals	A-
2017	Advances Medical Nutrition Therapy	B-

Except for the scientific ethics course, Florida State University graduate courses are graded S (pass) or U (fail). Passing is C plus or better. The Seminar Food/Nutrition course is graded CRE (credit) or NC (no credit). The course with S/U grading system is the first class where new graduate students are not required to present. The one with a letter grade is the class that required attendance of other students' presentations and presenting.