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Where Female Athletes Obtain Nutrition Information and the Reliability of the Source

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Abstract

Background: Social Media and online searches are easily accessible options for obtaining health information and education. However, not all social media sources are reliable sources of information.

Purpose: The purpose of this study was to identify the sources of nutrition information used by collegiate athletes and nutrition students. Participants' perception of the reliability of these sources was also examined.

Methods: A survey was used to gather samples from collegiate athletes, as well as nutrition students, at a small women's college in Boston, Massachusetts. The survey inquired where participants search for nutrition information, the nutrition sources they use the most, and their opinions regarding the reliability of these sources. Responses of the athletes were compared to responses of the nutrition students who have the educational background in nutrition.

Results: Athletes chose physicians and coaches as their top sources of nutrition information whereas nutrition students chose blogs and Registered Dietitians. Amongst nutrition students, 50.8% found registered dietitians to be a top 5 source of nutrition information whereas only 13.2% of athletes found Registered Dietitians to be a reliable source of information. Overall, Nutrition students obtained their nutrition information from more reliable sources than the sources used by collegiate athletes.

Discussion: Although social media was not reported as a reliable source of nutrition information, young female adults are looking at social media and online search engines for nutrition information.

Implications for Health Education Practice: Registered Dietitians are viewed as reliable sources of nutrition information by young adults and should disseminate nutrition education through popular sites such as blogs, websites, and magazines.

Background

Social Media and internet use are integrated into the fabric of our society. Known as "Generation Next," adolescents and young adults are turning to social media for their everyday needs because of its easy accessibility and quick guides to information [1]. Strom et al [2] showed the amount of time that adolescents spend online has increased to an average of fifteen hours per week whereas another study showed that 74% of US adults go online and 80% of these adults search for health information, which is the most popular online activity aside from email and using search engines [3]. Healthy People, released in 2010, included new objectives of using the World Wide Web to access health information in response to the growth in online activity [4]. In order determine where to best distribute reliable nutrition information, it is important to evaluate the sources currently used.

Amongst the young adult population, female collegiate athletes specifically have demanding nutritional needs. Fueling an athlete requires appropriate portion sizes and timing of meals and snacks based on both the unique needs of each individual athlete, as well as the specific requirements of each sport. Nutrition education from a Registered Dietitian can equip athletes with the best information to make informed choices for optimal performance and weight management. In addition to fueling with food, many athletes look to ergogenic aids to enhance sport performance. Ambrose et al [5] found that banned substances comprised 18% of medications searched on the internet by athletes and 30% of the drug or dietary supplement products submitted.

Another challenge for women in collegiate sports is the Female Athlete Triad, also known as Relative Energy Deficiency in Sport (RED-S). RED-S is an interrelation between sufficient energy intake, menstrual function, and bone mineral density. Female athletes are at risk for this condition, where energy restriction can lead to amenorrhea and osteoporosis, cardiovascular effects, stress fractures, and musculoskeletal injuries [6]. Screening for RED-S and disordered eating is commonly provided for female athletes entering college, especially in schools that employ a sports

Registered Dietitian who can provide appropriate education [7]. Valliant et al [8] examined nutrition education provided to eleven National Collegiate Athletic Association (NCAA) female volleyball players by a Registered Dietitian. Total energy, macronutrient intake, and sports nutrition knowledge were measured and found to be significantly improved compared to before nutrition education was provided. Anderson examined the impact of nutritional feedback by a Registered Dietitian on body composition and dietary intake of collegiate women volleyball players. During the feedback period, participants' intake of protein, Vitamin C, and calcium significantly improved compared to when there was no feedback [9].

While appropriate nutrition information and education are beneficial to college athletes, there are many avenues for obtaining nutritional information. Due to the ease of accessibility, "Generation Next" is accustomed to the use of social media for finding information, which is not always written by a credible source. Many studies show that using the internet as a teaching tool can aid in adolescent learning [1,2]. An Internet Learning Poll, consisting of 16 multiple-choice questions, attempted to ascertain how the Internet can be used as a teaching device and aid in motivation to learn [3]. The survey found that adolescents are more motivated to learn when they are using skills acquired through internet-use, such as social networking. Many blogs and online websites offer an individual this opportunity to interact with others.

While people may look to various types of resources for nutritional information, it is important to assess people's confidence in various types of nutritional information. In a Canadian study, 870 subjects responded to a survey posted to the Dietitians of Canada website [10]. The survey found that magazines are the most commonly used resource for nutritional information, with 49% of the respondents reporting that they use magazines to obtain nutritional information. Other frequently used resources include books, the Internet, food labels, and brochures. When looking at consumer confidence in sources of nutritional information, respondents reported high confidence levels in health professionals. Amongst the health professionals, 88% of the respondents reported high confidence in Registered Dietitians and 61% reported high confidence in physicians. Only 34% of the respondents reported confidence in magazines as a source of information, which is interesting considering the majority of the subjects reported using magazines most frequently to obtain nutritional information. This research, however, was conducted before social media became popular in 2005, thus there is no confidence rating for sites such as Facebook™, Instagram™, or Twitter™ as nutritional resources.

Another study looked at the reliability of nutritional resources, specifically focusing on information found on the Internet. In 2005, Bates et al [11] conducted a study to compare consumer evaluations of credible Internet resources versus non-credible Internet resources. The study found that participants who were given nutritional information with the credible source did not evaluate the subject matter to be more truthful, trustworthy, or readable than the non-credible source. The implications of this study are that credible sources need to find ways to convey a higher quality of information on their websites. This study presents a problem in society where credible resources are in competition with non-credible resources for important health information.

Purpose

The aim of this study was to assess where female collegiate athletes obtain their nutrition information and whether or not they view these sources as reliable. Collegiate athlete responses were compared to the responses of nutrition students because of the educational background of the nutrition students.

Methods

Study Design

This cross-sectional study surveyed female athletes and nutrition students at Simmons College in Boston, MA.

Participants

Survey responses were received from 138 students during a one-month period from February to March 2014. Of those who responded, 57 (46.7%) were athletes and 65 (53.3%) were nutrition students. Four participants were excluded who reported they were both an athlete and a nutrition student. The final number of participants was 122.

Data Collection

After gaining approval by the college's Institutional Review Board, a survey was used to gather a convenience sample from varsity athletes and nutrition students. The anonymous, self-administered survey, created on Survey Monkey, was provided to both populations. The survey link was distributed to varsity athletes through their respective coaches via e-mail and to all nutrition students via the college's Nutrition Department listserv. Varsity team athletes were defined as those students who were currently competing on a varsity sports team at the college. Nutrition students were defined as those students admitted to the Bachelors of Science (BS) or Masters of Science (MS) Nutrition program at the school.

Survey Design

The 31-item survey sought to determine where respondents search for nutrition information, their most used nutrition sources, and their opinions regarding whether these sources were reliable. Completion of the survey comprised agreement of participation. The pilot survey was reviewed and completed by the professors in the Nutrition Department and their comments and suggestions were followed. Both the study and the survey were approved by Simmons College's Institutional Review Board.

Demographics

Although the sample came from a narrow population, several demographic variables were obtained, providing a description of the population. An overview of the demographics of the survey participants is presented in Table 1.

Data Analysis

Descriptive statistics at baseline were used as presented in Table 1. Frequencies and percentages were used to assess trends. Chi Square tests were used to examine and compare the responses between varsity athletes and nutrition students. All analyses were performed using SPSS Software, Version 22. Associations were considered significant with a P-value <0.05.

Results

Description of Participants

Of the total 122 participants, 46.7% (n = 57) were varsity athletes

Table 1: Descriptive Statistics - Baseline Characteristics of nutrition students and student athletes at a small northeastern college

Number of Nutrition-Based Courses	Percent (%)	Number (n)
None	27.8	35
1-4 Courses	34.1	43
5+ Courses	38.1	48
Live on Campus	52.4	66
Live Off Campus	46	58
Year in School		
First Year	27	34
Second Year	19.8	25
Third Year	15.1	19
Fourth Year or More	38.1	48
Age		
18	12.7	16
19	23	29
20	13.5	17
21	7.1	9
22 +	43.7	55
Race/Ethnicity		
Other	3.2	4
African American	1.6	2
Asian	4	5
Hispanic or Latino	2.4	3
White	88.1	111
Weight		
Normal Weight	91.3	115
Overweight	7.1	9
Eating Disorder		
Yes	9.5	12
No	88.9	112
Meal Planning		
Never	16.7	21
1-2X/week	25.4	32
3-5X/week	32.5	41
6+X/week	22.2	28
Eat in the Dining Halls		
Never	29.4	37
1-2X/week	16.7	21
3-5X/week	14.3	18
6+X/week	38.1	48
Eat at Restaurants		
<3X/week	92.9	117
3-5X/week	5.6	7
Exercise		
Moderate		
No moderate exercise	4.9	6
1-2X/week	26.8	33

3-4X/week	30.9	38
5+X/week	36.5	46
Vigorous (X/week)		
No vigorous exercise	8.9	11
1-2	22	27
3-4	27.6	34
5+	40.5	51
Started using Social Media (age)		
Under 10	1.7	2
10-15	53.9	62
16-20	33	38
Over 20	11.3	13
Own a Desktop Computer	13.7	16
Own a Laptop	99.1	116
Own a Tablet (other than iPad)	12	14
Own an iPad	30.8	36
Own a Smart phone	86.3	101
Own an iPod Touch	13.7	16
Hours spent on social media		
0	0.9	1
<1	21.4	25
1-3	67.5	79
4-6	7.7	9
6+	2.6	3

and 53.3% (n = 65) were nutrition students. Out of the varsity athletes, 23% (n = 14) were cross-country runners, 21.3% (n = 13) were swimming and diving athletes, 19.7% (n = 12) were basketball players, 9.8% (n = 6) were volleyball players, 6.6% (n = 4) were soccer players and 1.6% (n = 1) were field hockey players. Athletes in their first year made up the majority of the group with 22.2% (n = 28). Athletes' academic majors were in Sciences (35.7%, n = 45), Arts and Humanities (6.3%, n = 8), Business (2.4%, n = 3) or Other (2.4%, n = 3). Please see Table 1 for complete results.

Social Media Use

For time spent per day on social media, 67.5% (n = 79) of all participants responded that they spend one to three hours on

Table 2: Favorite Source of Nutrition Information for athletes and nutrition majors combined

Sources	Percent (%)	Number (n)
Academic Classes	27.4	31
Research-Based	15.9	18
Registered Dietitian	15.9	18
Physician	8.8	10
Magazines	8.0	9
Blogs	6.2	7
Family	5.3	7
Websites	4.4	5
Friends	2.7	3
Coach	2.7	3
Strength/Conditioning Coach	1.8	2
Newspapers	0.9	1

Table 3: Top 5 Sources of Nutrition Information for athletes and nutrition majors combined

Source	Percent (%)	Number (n)
Academic Classes	71.3	82
Websites	59.0	68
Research-based Resources	49.6	57
Friends/Family	42.6	49
Registered Dietitian	33.9	39
Magazines	33.0	38
Physician	31.3	36
Blogs	30.4	35
Coach	22.6	26
Pinterest	15.7	18
Facebook	14.8	17
Instagram	11.3	13
Twitter	10.4	12
Newspaper	7.8	9
Strength Trainer	6.1	7

social media per day. (Table 1)

Top Sources of Nutrition Information

When ranking favorite sources of nutrition information, all participants chose academic classes as the top choice (27.4%, n=31), followed by research-based sources (15.9%, n=18), Registered Dietitians (15.9%, n=18), physicians (8.8%, n=10), magazines (8%, n=9), and blogs (6.2%, n=7). (Table 2)

When choosing top five sources of nutrition information, the combined participants chose academic classes as the top resource (71.3%, n = 82) followed by websites (59.1%, n=68), research-based sources (49.6%, n = 57), family/friends (42.6%, n = 49), Registered Dietitians (33.9%, n = 39), magazines (33%, n = 38), and physicians (31.3%, n = 36). (Table 3)

When choosing top five sources of nutrition information, athletes rated physicians, coaches, and friends/family higher than did nutrition students. (P values as follows: physician- P=0.005; coach- P<0.001; friends/family- P<0.001). Nutrition students rated blogs, Registered Dietitian, research-based resources, and academic classes higher than did student athletes. (P values as follows: blogs- P=0.012; Registered Dietitian- P<0.001; research-based resources- P<0.001; academic classes- P<0.001) There were no other significant differences between athletes and nutrition students. A Chi-Square test was used for this analysis. For full results, see Table 4.

On the topic of blogs as a top five source of nutrition information, nutrition students selected blogs as a top choice more than varsity athletes (n = 24; 40.7% compared to n = 10; 18.9%; p = 0.012). However, there was no significant difference in how reliable the nutrition students and varsity athletes rated blogs as a source of nutrition information (Tables 4 and 5).

Table 4: Reported Top 5 Sources of Nutrition Information: Athletes compared to Nutrition Students

Sources	Varsity Athlete (%)	Number (n)	Nutrition Major (%)	Number (n)	P-value
Newspapers	5.7	3	10.2	6	0.381
Magazines	26.4	14	39.0	23	0.158
Websites	52.8	28	66.1	39	0.153
Blogs	18.9	10	40.7	24	0.012*
Pinterest	13.2	7	16.9	10	0.582
Facebook	18.9	10	11.9	7	0.302
Instagram	17.0	9	6.8	4	0.092
Twitter	9.4	5	11.9	7	0.678
Registered Dietitian	13.2		50.8		<0.001*
Physician	45.3	24	20.3	12	0.005*
Coach	47.2	25	0	0	<0.001*
Strength Trainer	3.8	2	8.5	5	0.305
Friends/Family	81.1	43	10.2	6	<0.001*
Research-based	17.0	9	76.3	45	<0.001*
Academic Classes	45.3	24	93.2	55	<0.001*

* A Chi-Square test was used for analysis. Significance levels are based on p <0.05.

Table 5: Sources and Their Perceived Reliabiliy: Athlete compared to Nutrition Students

Sources	Reliability	Athlete (%)	Nutrition Major (%)	P-value
Newspapers	Not	10	18.6	0.204
	Somewhat	65	69.8	
	Very	10	11.6	
Magazines	Not	13.3	22.2	0.049*
	Somewhat	62.2	70.4	
	Very	24.4	7.4	
Websites	Not	13.7	20	0.460
	Somewhat	76.5	65.5	
	Very	9.8	14.5	
Facebook	Not	64.4	80	0.124
	Somewhat	31.1	20	
	Very	4.4	0	
Instagram	Not	69	83.3	0.066
	Somewhat	21.4	16.7	
	Very	9.5	0	
Twitter	Not	64.9	70.2	0.872
	Somewhat	32.4	27.7	
	Very	2.7	2.1	
Pinterest	Not	42.5	67.2	0.59
	Somewhat	52.5	28.6	
	Very	5	4.1	
RD	Not	7.9	4	0.434
	Somewhat	92.1	96	
	Very	100	100	
Physician	Not	0	6	<0.001*
	Somewhat	8.9	50	
	Very	91.1	44	
Coach	Not	0	12.2	<0.001*
	Somewhat	27.2	68.3	
	Very	72.9	19.5	
Strength/Conditioning Trainer	Not	0	4.5	<0.001*
	Somewhat	29.3	72.7	
	Very	70.7	22.7	
Friends	Not	7.7	40.4	<0.001*
	Somewhat	84.6	59.6	
	Very	7.7	0	
Family	Not	0	38.5	<0.001*
	Somewhat	68.6	59.6	
	Very	31.4	1.9	
Blogs	Not	33.3	36.7	0.520
	Somewhat	59	49	
	Very	7.7	14.3	
Research-Based	Not	10	9.8	0.975
	Somewhat	90	90.2	
	Very	100	100	

Academic Classes	Not	2.6	0	0.480
	Somewhat	7.7	9.1	
	Very	89.7	90.9	

A Chi-Square test was used for analysis. Significance is based on a p-value <0.05

Reliability of Nutritional Sources

When assessing the reliability of sources of nutrition information, results showed that athletes ranked magazines, physicians, coaches, strength/conditioning trainer, friends, and family significantly more reliable than did nutrition students. (P values as follows: magazines- P=0.049; physician- P<0.001; coach- P<0.001; strength/conditioning trainer- P<0.001; friends- P<0.001; family- P<0.001). Nutrition students and athletes were in agreement regarding the reliability of research-based sources of nutrition information (P = 0.975). (Table 5)

Discussion

In determining how to target nutrition information to certain demographics, it is important to know where consumers look for nutritional information and what they view as reliable. Nurse-Schorre et al [12] explored the desirability and credibility of nutritional information methods, using data collected in surveys from the National Family Opinion in May 2006. The findings in this study represent a shift in where consumers are looking for nutritional information. This study found that the internet scored high as a desirable source of nutrition information. Nutrition professionals scored highest for credibility, and medical professionals ranked second highest. Both the Internet and newspapers are among the top three resources, which may reflect the older generation's preferences for print material and the younger generation's preference for online resources [12].

As Anderson and Valliant et al [8,9] proposed in their studies, female athletes rely on nutrition education from a Registered Dietitian for improving their performance. When a Registered Dietitian is not available, disseminating proper nutritional information to the athletic community is important. However, there are many avenues for obtaining nutritional information. The goal of this study was to assess whether female athletes were obtaining information from multiple social media outlets and if they perceived these sources as reliable. These results were then compared to the responses from nutrition students.

This study indicated that the top five sources of nutrition information for the female collegiate population were friends and family, websites, coaches, physicians, and academic classes. It is important to note that the second most popular source of nutrition information for athletes was websites. The responses from athletes also showed that Registered Dietitians were a reliable source of nutrition information. This is an indication that Registered Dietitians should use this avenue for disseminating nutritional information.

Our findings showed that athletes' top five sources of nutrition information were friends/family, websites, coach, academic classes, and physician. However, nutrition students reported their top five sources of nutrition information as academic classes, research-based sources, websites, Registered Dietitian, and blogs (Table 3).

Both populations had different perceptions of reliability. Athletes ranked coaches, physicians, strength and conditioning trainers, friends, family, and magazines as significantly more reliable than did nutrition students. Both athletes and nutrition students felt that Registered Dietitians, research-based resources, and academic classes were reliable. Both athletes and nutrition students felt that websites were somewhat reliable.

It is interesting to note that athletes' top sources of nutrition information are also perceived to be reliable. Reliable sources that they do not appear to use are Registered Dietitian and research-based resources.

Our findings show that dissemination of nutritional information to female collegiate athletes should be aimed towards websites and magazines. Nutrition education delivered to coaches may also provide more relevant information to the athletic population. Another notable finding confirmed the study done by Nurse-Schorre et al [12] which found that nutritional professionals scored highest for credibility, and medical professionals ranked second highest. Our study also confirmed that nutritional professionals in an academic setting were most credible followed by medical professionals.

Of note, findings reveal that a Registered Dietitian is one of the most reliable sources of nutrition information reported, however, 28.6% of the total participants did not use a Registered Dietitian to access nutrition information.

Limitations of this study should be noted. The population size was small and confined to an all-female, northeastern school. This study used a convenience sample, thus results are not generalizable. Further research should be conducted with larger, more diverse populations to present a more generalizable study sample.

Translation to Health Education Practice

With social media integrated into our society, people are looking at various online sources for nutrition information. It is important to identify these sources so that the general population has access to accurate information regarding their health. However, more research should be conducted in larger, more diverse populations to improve the generalizability of our findings. The integration of the Internet into the lives of young people has expanded the available resources for information. Nutrition information from reliable resources should be targeted to locations where young people travel most.

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