



Technical Note

The Influence of Education on the Nutritional Knowledge of Certified Fitness Professionals

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ABSTRACT

International Journal of Exercise Science 14(4): 239-249, 2021. The American Fitness Industry has seen progressive success with recent increases in facility memberships and annual revenues of fitness centers. The number of fitness trainers and instructors in the United States has persisted this growth and is projected to grow over the next decade. However, only a few known studies have investigated the nutritional education of fitness professionals. This preliminary study explores the education and knowledge among certified fitness professions (CFPs) in the United States. A cross-sectional, descriptive survey design was utilized with a convenience sample of 120 female participants from the United States who were associated with a major fitness newsletter. The average age of the participants was 48.51 years (SD 12), and they had 14.85 years of experience (SD 10.16) and worked an average of 22.04 hours per week (SD 16.78). Most of the participants had some kind of college degree (96.2%) and held a group fitness certification (76.6%) or personal training certification (47.5%). Those with a nutrition certification were found to have significantly higher nutrition knowledge test scores on the 21 question test (18.2 ± 2.0 correct to 17.1 ± 1.9 , $p=0.04$). Additionally, it is revealed that CFPs use the internet as a primary source for nutritional information and was the most frequently used source of nutrition information accessed. This pilot study suggests a more in-depth study would be beneficial to solidify the current results and could allow for more investigation into whether or not completion of nutrition coursework within formal earned degrees by CFPs positively influences their nutritional knowledge.

KEY WORDS: Certifications, professional development, continuing education, nutritional background

INTRODUCTION

The American fitness industry has seen progressive success, with recent increases in facility memberships from 32.8 million to 60.87 million in 2017 (25). In addition, annual revenues of fitness centers averaged \$25.8 billion in 2015 alone (25). The number of fitness trainers and instructors in the United States has kept up with this growth, with an addition of 544,200 employees in 2014 (29). Furthermore, the fitness trainer and instructor profession has an expected growth rate of 13% by 2024 (29).

According to the U.S. Department of Labor, fitness trainers and instructors lead, instruct, and motivate individuals or groups in exercise activities and work with people of all ages and skill levels (29). For many years, professional advocates have suggested that fitness professionals should have licensing requirements, such as bachelor's degree in exercise science and certification by an organization whose criteria are extensive and widely accepted (14). While the United States has no licensure requirement, there are a plethora of certifications offered by fitness companies across the U.S., including the American Council on Exercise (ACE1), American College of Sports Medicine (ACSM), Athletics and Fitness Association of America (AFAA), National Association of Sports Medicine (NASM), National Strength and Conditioning Association (NSCA) and SCW Fitness Education. Fitness professionals certified by these organizations (certified fitness professionals (CFP)) are provided with some training in the exercise science field. For example, ACSM offers a personal training certification to candidates who pass an online exam, which includes client consultation and assessment, exercise programming and implementation, exercise leadership and client education, and legal, professional business and marketing fitness content (3). More comprehensive certifications include the NSCA's Certified Strength and Conditioning Specialist program, which requires students to have more extensive nutrition knowledge, including knowledge in specific nutritional programs designed to maximize performance for athletes (8).

As a workforce, CFPs often encourage lifestyle and behavioral changes to facilitate health benefits to their clients due to the nature of the profession, which allows for teachable moments, prolonged time with the client, and the synergistic effect exercise has on nutritional behaviors (13). Furthermore, clients often seek out nutrition and health advice from CFPs (26).

Various industries (e.g., educational, health and wellness) in the United States use the Dietary Guidelines for Americans and the well-known Food Guide Pyramid, MyPyramid, and MyPlate over the last 25 years in an effort to inform the general public of national nutrition standards (30). Most CFPs are familiar with these guidelines and are within their professional scope of practice to use these guidelines to advise clients. In accordance with state-level licensure laws, CFPs should refer clients who present nutrition questions related to therapeutic conditions to licensed and registered dietitian nutritionists (RDNs).

There are strict guidelines on what nutritional advice and consultation the fitness and health professional can give clients. The ACSM limits their certified personal trainers to educate their clients only on the influence that nutrition and physical activity habits have on their overall health and fitness (3). Other programs follow suit, such as the ACE, NASM, AFAA, and SCW Fitness personal trainer certifications. CFPs from these programs should be knowledgeable on broad nutrition topics, such as hydration concepts and portion sizes, but are still restricted from creating nutrition programs (e.g., caloric intake, food nutrition break down) for their clients (1, 2, 3, 19, 20).

Only a few known studies have investigated the nutritional education consistency of fitness professionals. CFPs with the appropriate academic preparation leading to degrees and certifications were set apart from the CFPs who rely on sources of the internet. One study by

Johnson et al. (10), a Canadian based study, found that 85.1% of the exercise professionals were promoting healthy eating in clients, and 47.9% use their national guidelines for promoting healthy eating. Another study in Australia found that 88% of their registered exercise professionals were working outside their scope of practice (17). The knowledge of exercise professionals in the area of nutrition has yet to be studied comprehensively in the United States. This lack of information is not only inconvenient but may also lead to unsafe and ineffective care for clients (16).

The purpose of this study is to explore nutritional education and knowledge among CFPs in the United States. There are five primary research questions 1) What are the education credentials and occupational demographics of CFPs; 2) Is there a difference between CFPs education and nutritional knowledge; 3) Is there a difference among CFPs certification(s) and their nutritional knowledge; 4) Is there a difference between years of experience and CFPs nutritional knowledge; and 5) What are the sources of nutrition education used by CFPs? And we propose three major hypothesis with these research questions: 1) There are differences between CFPs education and nutritional knowledge, with higher education leading to increase nutritional knowledge; 2) There are differences among CFPs certification(s) and their nutritional knowledge, with those with more certifications having higher nutritional knowledge; and 3) There are differences between years of experience and CFPs nutritional knowledge, with those with more experience having higher nutritional knowledge.

METHODS

Participants

Approximately 1,000 members from fitness industries across the United States received an email linked to a survey with their bi-monthly newsletters. 146 members clicked on the link to start the survey. Of the 146 surveys started, 26 surveys were eliminated because they had less than 50% completed, and one survey was completed by a male. Due to the fact that only one male responded to the survey, we only included females. The educational background and demographics of the subjects were also assessed in this study. Factors such as age, sex, year of experience, educational level, certification(s) earned, and additional nutritional training were also collected.

This was a cross-sectional, descriptive survey design with a convenience sample of 120 female participants from the United States. The sample size utilized in this investigation was of a sufficient n, and an a priori power analysis was performed using G* Power software (G Power, Heinrich-Heine University of Dusseldorf, Dusseldorf, Germany) The power analysis determined a power level of 0.8, an alpha level of 0.05, and moderate effect size of 0.5 were achieved with our sample size. The effect-size for all significant relationships were calculated using Cohen's d, and assessed using the following criteria: <0.2 = small; 0.2 to 0.79 = moderate; ≥0.8 = large. (7). The descriptive research attempts to describe the influence of education and nutritional knowledge without influencing the participants' decisions, making the survey the most common method of descriptive research (28). The Institutional Review Board of the sponsoring university approved this study. Data reported in the present study represents a

portion of a substantially larger research project focused primarily on the frequency and confidence levels of nutritional advice provided by CFPs. This research was carried out fully in accordance with the ethical standards of the International Journal of Exercise Science (22).

Protocol

Participants were recruited by a listserv email of one of the major fitness companies. Close to 10,000 members of listserv received an email during the spring of 2017 with a link to the bimonthly newsletter. Surveys had to be fully completed in order to be included in the study. Consent by participants was implied once opening the survey link. An incentive of a \$200 registration fee for a fitness conference was raffled off for those who wanted to leave their email address to be entered into the raffle. Email addresses were stripped from the data prior to any analysis to ensure anonymity.

Assessments/Survey Instruments Knowledge: Nutritional knowledge was assessed by using the revised General Nutritional Knowledge Questionnaire (GNKQ), which was originally developed and validated for the United Kingdom adult population in the 1990s by Parmenter and Wardle (23). Recently, when it was updated and revised, those changes were validated by Kliemann, Wardle, Johnson, and Croker in 2016, and they noted the reliability to be > 0.7 (12). The 21 questions are multiple-choice in nature, offering several options and a “not sure” option for all questions. Questions are designed to test the nutrition knowledge of the subjects. For example, “Which of these diseases is related to how much sugar people eat? A) High blood pressure, B) Tooth decay, C) Anemia D) Not sure.” An incentive of a \$200 registration fee for a fitness conference was raffled off for those who wanted to leave their email address to be entered into the raffle. Email addresses were stripped from the data prior to any analysis to ensure anonymity.

Statistical Analysis

Data analysis for this program was run on the SPSS Software, version 22 (SPSS Inc., Chicago, IL). Descriptive and inferential analyses were used on both scores. Analyses of the descriptive nature were frequencies, means, and percentages. The statistical analyses of this study were inferential statistics that compared education background with nutrition advice, the difference between background and confidences, and factors that influence nutritional knowledge of CFPs using both ANOVA and Chi-Square.

RESULTS

Demographics: The surveys completed consisted of 120 participants (N=120) were included in the data analyses, 25 surveys were eliminated because they had less than 50% completed, and one survey was completed by a male. The average age of the participants was 48.51 years (SD 12), and they had 14.85 years of experience (SD 10.16) and worked an average of 22.04 hours per week (SD 16.78). The majority of the participants were from the Southeast, Midwest, and Northwest (35.9%, 28.1%, and 15.6%, respectively). Most of the participants were average weight (75.4%), and most (96.2%) had some kind of college degree. Most participants held a group

fitness certification (76.6%), and about half (47.5%) had a personal training certification. See table 1 for the demographic breakdown.

Table 1. Demographics of survey respondent with female certified fitness professionals.

	N	%
Region of United States		
Northeast	20	15.6
Southeast	46	35.9
Midwest	36	28.1
Northwest	6	4.7
Southwest	10	7.8
Non continental	2	7.8
Years of Experience		
<10 years	44	41.9
>10 years	61	58.1
Highest Level of Education		
High School	2	1.6
Some college	22	17.2
Bachelors	59	46.1
Masters	34	26.6
Terminal (PhD/MD)	3	2.3
Type of Certifications		
Group Fitness	92	76.6
Personal Training	57	47.5
Special Pops	36	30.0
Other	28	23.3
Certification Company		
Other companies	54	42.2
Athletics and Fitness Association of America	44	34.4
SCW Fitness	42	32.8
American Council on Exercise	42	32.8
American College of Sports Medicine	16	12.5
National Academy of Sports Medicine	8	6.3
National Strength and Conditioning	2	1.6

Table 2 highlights the common sources of nutritional education that by the percentage that CFP utilized, the three most common include internet (94.1%), books (87.7%), and workshops (81.6%). The majority of fitness professionals utilized non accredited sources for nutrition knowledge (internet) on a daily to weekly basis but nutrition and scientific journals and healthcare professionals, such as physicians and registered dietitians, on more of a monthly to an annual basis. The majority of fitness professionals also never used a health food store for nutrition information.

Table 2. Certified fitness professional nutrition information.

Source	Overall%	Daily/Weekly%	Monthly/Annually%	Never%
Internet	94.1	62.7	31.4	5.9
Books	87.7	30.7	57.0	12.3
Workshops	81.6	1.0	80.7	18.4
Other Fitness Professionals	79.6	27.4	52.2	20.4
Nutritional Magazine	79.3	24.1	55.7	20.7
Scientific Journal	65.5	14.1	51.3	34.5
Doctor MD	59.5	9.0	50.4	40.5
Registered Dietitian	52.3	9.0	43.2	47.7
Testimonials	54.1	15.6	36.5	45.9
Family/Friends	51.8	10.7	41.1	48.2
Health Food Store	40.5	9.9	30.6	59.5

Knowledge: On average, the participants scored 79.38% (SD 9.09) on the knowledge test, which was 17.463 points out of 21 points. The item analysis for the nutritional knowledge test revealed that CFPs had the strongest grasp (>90% correct) of the following topics: food label, fiber, fat, monitoring weight, diabetes prevention, sodium, heart disease, and glycemic index. However, the weakest areas with less than 50% of CFP answering correctly included: Cancer, weight management, nutritional supplements, and BMI categories.

Education and Certifications: There were no significant differences found between CFP's academic background and nutritional knowledge. A one-way ANOVA was calculated comparing test scores between fitness professionals with less than a bachelor's degree (16.6 ± 1.8), a bachelor's degree (17.5 ± 1.6), and with more than a bachelor's degree (17.4 ± 2.4). No significant difference was found ($F(2,117) = 1.865$, $p = 0.159$) between the groups.

Although the majority of certifications (personal training, group fitness, special populations) showed no differences in nutritional knowledge, those who had a nutritional certification had significantly higher scores than those who did not have a nutrition certification (18.2 ± 2.0 and 17.1 ± 1.9 with the $p=0.044$). While a statistical difference was noted, there was no practical difference since it resulted in only scoring 1 point better.

Year of Experience: An independent samples t-test was calculated comparing test scores between fitness professionals with <10 years of experience to those with ≥ 10 years of experience. Levene's test showed that the assumption of equal variances between experience levels was violated (0.028). Assuming unequal variance, no significant difference was found ($t(116) = -1.884$, $p = 0.063$) between fitness professionals with <10 years of experience (16.8 ± 2.3) to those with ≥ 10 years of experience (17.6 ± 1.7).

Table 3. Knowledge item analysis for nutritional knowledge test (n = 120).

Questions	Correct%	Incorrect%
Which one of these diseases is related to a low intake of fiber?	99.2%	0.8%
Which one of these disease is related to how much sugar people eat?	91.7%	8.3%
Which of these diseases is related to how much salt (or sodium) people eat?	96.7%	3.3%
Which one of these options do experts recommend to reduce the chances of getting cancer?	40.8%	59.2%
Which one of these options do experts recommend to prevent heart disease?	96.7%	3.3%
Which one of these options do experts recommend to prevent diabetes?	96.7%	3.3%
Which one of these foods is more likely to raise people's blood cholesterol?	85.8%	14.2%
Which of these foods is classified as having a high Glycemic Index (Glycemic Index is a measure of the impact of food on blood sugar levels, thus a high glycemic Index means a greater rise in blood sugar after eating)?	93.3%	6.7%
To maintain a healthy weight, people should cut fat out completely.	99.2%	0.8%
To maintain a healthy weight, people should eat a high protein diet.	62.5%	37.5%
Eating breakfast always causes weight gain.	99.2%	0.8%
Fiber can decrease the chances of gaining weight.	81.7%	17.5%
Which of these options can help people maintain a healthy weight?		
Not eating while watching TV	97.5%	2.5%
Reading food labels	99.2%	0.8%
Taking nutritional supplements	44.2%	53.5%
Monitoring their eating	98.3%	1.7%
Monitoring weight	92.5%	7.5%
Grazing throughout the day	35.8%	63.3%
If someone has a Body Mass Index of 23 kg/m ² , what would their weight status be?	78.3%	21.7%
If someone has the Body Mass Index of 31 kg/m ² , what would their weight status be?	46.7%	52.5%
Which body shape (Apple Shaped or Pear Shaped) increases the risk of a cardiovascular disease?	91.7%	8.3%

DISCUSSION

The purpose of this study was to investigate the effect of nutrition education of CFPs on their nutritional knowledge. The only difference in education was found in the type of certification the CFPs possessed; those with a nutrition certification were found to have significantly higher nutrition knowledge test scores. In addition, it was revealed that CFPs use the internet as their primary source for nutritional information and the internet was the most frequently used source of nutrition information they accessed.

Demographics of CFPs: The response rate to this survey was low but consistent with the national trends for online surveys (11). In this study, the average age of the participant was 49 years old, with almost 15 years of experience. Other large fitness industry surveys, such as the ACSM's 2019 Trend survey, tended to have younger participants; however, their participants were similar regarding years of experience. This study found that the educational background of the majority of CFPs was to have some type of college degree (>75%), which is similar to recent findings of McKean et al. (17). However, this large percentage represents a shift from a previous study that noted a few of the CFP respondents had a college degree (only 35%) (15). The field of exercise science does not have consistent education, licensure, or certification requirements in

the United States, yet our research is showing that more fitness professionals do have a degree and certification(s).

Nutritional Knowledge: On average, the participants scored well (79.38%, SD 9.09) on the knowledge test, which is consistent with a recent report on Australian exercise professionals (78.4%, SD 9.6) (16). There were no significant differences found between CFP's academic background and nutritional knowledge. Unfortunately, we were not able to capture the type of degree the participants earned, which may have influenced the scores. In the future, it is recommended to delineate between exercise science, allied health, and non-allied health degrees to show if formal education can influence nutritional knowledge. In a recent study by McKean and colleagues (16), they found that CFPs had more general nutritional knowledge compared to community members. Nevertheless, another study highlighted that only about half of CFPs perceived education as important for professional practice (18). This may change as several health and fitness organizations will increase their requirements for specific certifications, requiring those interested in sitting for national certifications to have a degree in allied health including American College of Sports Medicine (ACSM) and National Strength and Conditioning (NSCA) starting in 2027 and 2030, respectively (5, 21).

The majority of the CFPs (> 90%) were knowledgeable on basic nutrition factors about knowledge including fiber, sodium, sugar, heart disease, diabetes, glycemic index, food label, eating behaviors, and body shape risk. These nutrition topics are often areas clients/patients seek advice on from their fitness profession (24). Working within their scope of practice, CFPs have the basic nutritional knowledge to advocate for healthy nutrition behaviors in these nutrition topics and to help prevent these chronic diseases. While the majority of CFPs had knowledge on basic nutrients and some of the most common chronic diseases, the survey also showed that CFPs didn't know about nutrition related to all chronic diseases and also didn't have nutrition knowledge related to means to help maintain healthy weights and what constituted an obese BMI. More than 50% of participants missed nutrition questions related to cancer, BMI obesity categories and the effects of grazing and supplement use on weight maintenance. These data suggest that CFPs may benefit from additional nutrition-based training for topics within their scope of professional practice or may benefit from working in collaboration with a registered dietitian nutritionist for areas beyond their scope of professional practice.

Certifications and Nutritional Knowledge: Along with academic background, this study explored the effects of different certifications, including personal training, group fitness, special population, and nutrition-focused. Although the majority of certifications (personal training, group fitness, special populations) showed no differences in nutritional knowledge, those who had a nutritional certification had significantly higher scores than those who did not have a nutrition certification (18.2 ± 2.0 and 17.1 ± 1.9 with the $p=0.044$). While a statistical difference was noted, there was no practical difference since it resulted in only scoring 1 point better. Typically, fitness certifications, especially personal training and strength and conditioning certifications, have basic nutritional information as part of the knowledge base required. While subjects with nutrition-based certifications were more knowledgeable about nutrition than

subjects without nutrition certifications, the data still suggest that, in general, CFPs had improved basic nutritional knowledge. This nutritional knowledge may come from an interest in the subject as noted by the wide variety of sources that CFPs obtained their nutritional knowledge from, but it may also come from their basic fitness certification since personal training and strength and conditioning certifications usually have basic nutritional information as part of their knowledge-based requirement for certification. Further, there has been an increase in nutritional certifications from popular fitness companies (i.e. ACE, NASM, AFPA) to improve fitness professional knowledge, skills and marketability in the field. More research is needed to discern the influence these industry's nutritional certifications may have on fitness professional knowledge.

Sources of Nutrition Education Used by CFPs: As with any field, professionals need to continue to educate themselves on the current practices and developing issues within their field of practice, often referred to as "continuing education." Nutrition is a complementary area to exercise and has overlapping impacts on clients' health and fitness, so CFPs need to stay current on nutritional trends, research, and practices (27). Our study found the common sources of nutritional education that the CFPs utilized included the internet (94%), books (88) and workshops (82%). This finding is differs from the previous research in 2000, which found textbooks (81%), college class notes (80%), scientific journals (79%), workshops/seminars (78%), past experience (51%), colleagues (49%), and mass media (20%) (9). The higher prevalence of internet use today might be explained by an overall increase in the common usage of the internet over the past decade in the United States, from 52% in 2000 to 90% in 2019 of adults (6). Again, the delineation of what sources of the internet were used by the CFP was not defined. Future studies should address the types of websites that are being accessed by CFP for nutritional information and education.

Limitations: There are some limitations that may affect the generalizability of these results. First, the sample size was relatively low; however, this was a pilot study of the United States, and previous other national studies had comparable numbers (Australia and Canada). Furthermore, only females were included in this convenience sample, and this study can not be generalizable across genders. People with a greater interest in nutrition may be more likely to have opted into the survey. There is a possibility that some participants might have guessed or searched for the correct response, however in order to reduce the guessing, all answers had the option "not sure," and the instruction stated clearly that people should click "not sure" rather than guessing. All the data collection was online, which means that those without internet connection and accessible devices were excluded. Although we had representation for all regions of the United States, this was only sent to those who were affiliated with one major fitness organization and cannot be generalizable.

This study is one of the first studies to investigate the nutritional knowledge of American CFPs and the influence of their education and training. Although years of formal education in any discipline and experience did not seem to influence nutritional knowledge, having education in the form of a nutrition certification may have slightly increased their knowledge, though the degree to which these results are applicable may be minimal. Additionally, we saw in the

demographics of CFPs, older and more educated compared to previous studies. This pilot study suggests that a more in-depth study would be beneficial to solidify the current results and could allow for more investigation into whether or not completion of nutrition coursework within formal earned degrees by CFPs positively influences their nutritional knowledge. In addition, since some sources for nutrition knowledge are more credible than others, further investigation into the specific internet sources used by CFPs would be beneficial.

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