

Effectiveness of a Required Health-Related Fitness Course on Dietary Behaviors Among Community College Students

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ABSTRACT

Purpose*: The purpose of this mixed-methods study was to: (a) evaluate the effectiveness of a required Health-Related Fitness (HRF) course in changing dietary behaviors among community college (CC) students, and (b) explore student perceptions about the effectiveness of HRF curriculum activities in changing behaviors.* ***Methods****: Pre- and post-semester data were gathered from 76 CC students (aged 18-34) enrolled in four HRF courses on a CC campus in Texas. Pre- and post-survey questions included demographic and dietary behavior questions from the College Student Health Survey. Descriptive statistics were used for demographic data, while repeated measures Multivariate Analysis of Variance (MANOVA) analyses were used to analyze dietary behaviors. Dietary behaviors were measured by fruit and vegetable (FV) consumption, meal patterns (breakfast, fast food, restaurant eating), and sugar-sweetened beverage intake (soda, diet soda, fruit drinks, sports drinks, coffee drinks, and other sweetened beverages). Frequency statistics were conducted on themes emerging from open-ended questions (post-survey).* ***Results****: No significant changes were found in FV consumption. There were meaningful changes in dietary patterns, including significant increases in breakfast eating, significant decreases in sports drink consumption, and decreases in other sugar-sweetened beverage categories. Most students (96.1%) reported that the HRF course was beneficial. Participants' curriculum*

recommendations included additional instructional time regarding selection and preparation of healthier foods. Sustainability suggestions included tracking, motivation, support, and continuing education. ***Conclusions****: Significant changes among meal patterns and sugar-sweetened beverages represent positive shifts, yet additional instructional time and course activities may be warranted to increase FV consumption. The HRF course appears to be a valuable intervention for teaching healthy lifestyle behaviors to the young adult population.* ***Recommendations****: Additional research is needed to compare different age groups, gender and ethnic differences, and four-year vs. CC students. Longitudinal studies can be helpful in determining long-term influences of HRF courses on students' health behaviors. Focus groups can also be implemented to capture additional information regarding students' perceptions about the HRF course and modifications to enhance learning and promote lasting healthy behavior change. Additionally, experiential learning activities can be integrated to enhance retention of learning and develop students' self-efficacy for adopting healthy dietary behaviors.*

INTRODUCTION

Today's young adults (aged 18-24 years) are highly susceptible to a number of chronic health conditions including obesity, stroke, and diabetes mellitus (Dalleck & Kjelland, 2012; Kernan & Dearborn, 2015; Morrell, Lofgren, Burke, & Reilly, 2012). Obesity is concerning because it is linked to poorer mental health and diminished quality of life. Obesity increases the risk of cancer by 50 percent, and more than 80% of type 2 diabetics are overweight or have a history of excessive weight problems (Hoeger & Hoeger, 2017). Furthermore, obesity is a risk factor for leading causes of death in the US, including diabetes, heart disease, stroke, and certain types of cancer (Centers for Disease Control and Prevention, 2018). It is also troubling that young adults are now gaining weight faster than their parents, with an average weight gain of 30 pounds during this phase of life (Gordon-Larsen, The, & Adair, 2010). A study of Minnesota college students found obesity to be twice as likely among two-year college students as compared to four-year university students (Laska, Pasch, Lust, Story, & Ehlinger, 2011). Obesity and obesity-related chronic diseases are directly influenced by personal lifestyle behaviors such as diet and physical activity (PA). The college years have been identified as an important time when young adults often develop lifelong patterns related to behaviors that directly influence their health (Cluskey & Grobe, 2009; Myers & Mobley, 2004; Sparling & Snow, 2002). Therefore, colleges and universities are in a prime position to positively influence students' health behaviors, including their dietary and physical activity behaviors.

In the past, physical education was required in schools at all levels, including colleges and universities, and served to promote the health of young adults. During the 1920's and early 1930's, a high percentage (97%) of four-year colleges and universities required physical education; but by 2010, the physical education requirement had dropped to 39% (Cardinal, Sorensen, & Cardinal, 2012). During the late 1950's, a lecture-laboratory approach known as Health-Related Fitness (HRF) or Conceptual PE became popular among colleges and universities (Corbin & Cardinal, 2008). More recently, Kulinna, Warfield, Jonaitis, Dean, and Corbin (2009) found that 44% of universities, 61% of four-year colleges, and 27% of two-year colleges required this type of lecture-laboratory course. In addition, Strand, Egeberg, and Mozumdar (2010) reported that the HRF course was a graduation requirement in 57.8% of four-year institutions and 18.2% of two-year institutions. In their 2012 study, Hager, George, LeCheminant, Bailey, and Vincent compared a traditional classroom lecture and an online version of a general education health and wellness course among freshmen and sophomore students at a Western university. Statistically significant improvements were reported in both dietary and PA behaviors with stronger improvements reflected in the classroom lecture format (Hager et al., 2012).

Recent reductions in the total hours required for graduation have caused many institutions, both two- and four-year, to eliminate HRF courses from the curriculum. As a result, current research on HRF fitness courses has dramatically declined as the graduation requirement linked to these classes has waned. Studies focusing on community college (CC) HRF fitness courses are even rarer, although one study focusing on minority CC students' PA behaviors reported that students taking a physical education or general health course had increased leisure-time PA (Sullivan et al., 2008).

With 7.2 million students enrolled in credit courses in U.S. community colleges, this segment of the college population represents a substantial number of young adults (American Association of Community Colleges, 2018). Open admission policies, lower tuition rates, and opportunities to work and attend school while living at home help make community colleges popular, especially among lower-income and first-generation college students (Ma & Baum, 2016). According to Pokhrel, Little, and Herzog (2014), the majority of the research on health behaviors among college students has focused on college students attending four-year institutions. Few research studies have investigated the effectiveness of HRF courses in influencing CC students' dietary and PA behaviors. However, community colleges provide a valuable resource for researchers to study health behaviors and health outcomes among several higher risk demographic groups, specifically ethnic and socioeconomically disadvantaged groups. Nanney et al., (2015) emphasized the need for research and innovative interventions among the CC population in relation to weight and weight-related behaviors.

PURPOSE

The purpose of this mixed-methods study was to: (a) evaluate the effectiveness of a HRF course in changing dietary and PA behaviors among CC students, and (b) explore CC student perceptions about the effectiveness of HRF curriculum activities in changing dietary and PA behaviors. This article focuses exclusively on the students' dietary behaviors and their perceptions regarding the effectiveness of the HRF curriculum in promoting healthy dietary behavior change.

METHODS

Sample

Approval for the study was obtained from the Institutional Review Boards at Tarrant County College (Texas) and Texas Woman's University. Study participants included a purposeful, nonrandom sample of students (aged 18-34) enrolled in four sections of a required HRF course during the 16-week 2013 fall semester on a single CC campus in North Texas. The four courses followed the same curriculum and were taught by full-time Kinesiology instructors in a face-to-face format. All instructors who taught the HRF course—full-time as well as adjunct—were required to follow a specific, structured curriculum with only 55 of the possible 400 total points (13.75%) at individual instructors' discretion. All instructors were required to use the same textbook, labs, and major class projects including the diet analysis lab, which is a computer program included with the textbook. Quizzes, including the final exam, were developed by the full-time faculty and consistent across all sections of the course. All sections also included specific classroom activities and physical workouts each week. The remaining component (55 points) that may have varied across courses included assignments such as pop quizzes, discussion board and other online assignments, or additional classroom activities.

Outcome Measures

A mixed-methods approach was utilized with pre- and post-surveys to measure dietary behaviors including fruit and vegetable (FV) consumption, meal patterns, and sugar-sweetened beverage intake. With prior approval, specific survey questions were selected from the *College Student Health Survey* (Boynton Health Services, 2013). The post-survey also included six open-ended questions developed by the first two authors and reviewed by two university faculty members who are Master Certified Health Education Specialists. These questions were designed to measure students' perspectives about effective curriculum activities, recommendations for curriculum changes, as well as sustainability suggestions for healthy dietary behaviors.

Data Collection Procedures

During the second week of the semester, the primary researcher attended each course section to explain the study. All students completed a consent form to indicate their decision whether to participate in the study. To protect student anonymity, all consent forms were returned directly to the primary researcher so neither students nor instructors knew which individuals agreed to participate. Verbal and written confirmations were given to all students informing them of their right to opt out of the study at any time without penalty.

As part of the HRF course curriculum, all students completed surveys (weeks 3 and 14); but only the data from students consenting to participate in the study were included in the research study. Unique ID numbers were

assigned to each participant and their data to protect students' confidentiality, with only the researcher having access to the ID codes.

Data Analysis

The data analysis software used for this study was SPSS 20.0 for Windows (IBM Corporation, 2011). Descriptive statistics were used to analyze the demographic data. Dietary behavior questions were grouped into three categories according to meal patterns (breakfast, fast food, restaurant eating), FV consumption, and sugar-sweetened beverage intake. Dietary behaviors were analyzed using repeated measures Multivariate Analysis of Variance (MANOVA). Wilk's Lambda was interpreted for the overall model significance with effect size calculated using eta-squared (η^2).

Responses to the open-ended questions (at the end of the post-survey) were entered into an Excel spreadsheet, and themes were developed for each question. Codes were then assigned to each theme. To establish inter-rater reliability, a random sample of 10 participants' answers (n = 60) was selected and given to a content expert to code. The expert was a full-time Kinesiology instructor with more than five years of experience teaching the HRF course but was not among the four instructors involved in the study. Coded answers were compared between the researcher and the expert, and agreements were reached on any discrepancies in themes and codes. The researcher then reviewed and recoded the data set as needed, and frequency statistics were run for each open-ended question and the corresponding themes.

RESULTS

Demographics

Of the 104 students enrolled in the four courses, 98 met the age qualifications for the study (aged 18-34 years). A total of 83 students (84.7%) agreed to participate in the study with 76 students (91.6%) completing the entire study. The majority of study participants (77.1%) ranged from 18 to 21 years of age (M = 20.1 years, SD = 3.5), were female (57.8%), single (69.6%), and living with their parents (83.1%). Latino/Hispanic (38.6%) made up the largest ethnic grouping, followed by White (27.7%), Asian (14.5%), Black (9.6%), Other (6.0%), and Middle Eastern (3.6%). Working off-campus was common, with 48.8% working 21-40 hours per week and only 19.5% reporting no time spent working off-campus.

Pre- and Post-Surveys (Quantitative)

The pre- and post-surveys addressed three major areas of dietary behaviors: FV consumption, meal patterns (breakfast, fast food, restaurant eating) and intake of sugar-sweetened beverages (soda, diet soda, fruit drinks, sports drinks, coffee drinks, and other sweetened beverages). No statistically significant changes were reported in the consumption of FV [Wilks' λ = .955, F (5, 71) = .676, p = .643, η^2 = .05]. Mean scores for each of the five individual FV questions increased, yet univariate tests found no statistically significant differences (see Table 1).

Meal patterns produced a statistically significant multivariate change across time [Wilks' λ = .880, F (3, 73) = 3.33, p = .024, η^2 = .12] with a medium effect size of .12. This medium effect size indicated that 12% of the variance in scores could be credited to the time of the pre- and post-surveys. Univariate analysis found statistically significant increases in the number of days of breakfast eating [F (1, 75) = 4.71, p = .033, η^2 = .06]. Again, some practical significance was indicated with the medium effect size of .06. Mean scores for breakfast eating rose while fast food consumption declined, both of which were desired changes in participants' dietary behaviors. However, a small rise was reported in the mean scores for restaurant eating (see Table 1).

To view the data another way, frequencies were calculated for breakfast, fast food consumption, and restaurant eating. Participants' responses for breakfast eating are displayed in Table 2. The most prominent changes within breakfast eating occurred with zero days (8.4% pre vs. 2.6% post) and seven days (28.9% pre- to 35.5% post). Decreases (33.7% pre vs. 23.6% post) were observed in low breakfast eating (0 - 2 days per week), while increases (51.8% pre- vs. 55.3% post) were reported in high breakfast eating (5 – 7 days/week). Fast food consumption decreased from 62.6% pre-survey to 48.7% post-survey (daily; 1+ times/week; 2+ times/week). However, fast food consumption increased in the lower consumption categories of "one-to-two times per month" (25.3% pre vs. 34.2% post) and "a few times per year" (8.4% pre vs. 13.2% post). Decreases were also reported for restaurant

eating among all consumption categories except "0," "1-2 times per month," and "daily."

Intake of sugar-sweetened beverages also produced statistically significant results [Wilks' λ = .836, *F* (6, 70) = 2.29, *p* = .045, η^2 = .16]. Within sugar-sweetened beverages, univariate tests found statistically significant changes with sports drinks consumption [*F* (1, 75) = 8.29, *p* = .005, η^2 = .10]. The medium effect size of .10 showed some practical significance for this study. Mean scores among four of the six individual sugar-sweetened beverage areas declined (sports drinks, diet soda, fruit juices, and other sweetened beverages). The changes in mean scores and univariate significance for each of the sugar-sweetened beverages categories are displayed in Table 1.

Open-ended Questions (Qualitative)

The post-survey included four qualitative questions related to the course benefits, effective course activities, recommendations, and sustainability. The first open-ended question asked whether the HRF course was beneficial to the participants and to provide an explanation for the answer. The vast majority of participants (n = 73, 96.1%) reported the HRF course as beneficial, with knowledge of health/healthy lifestyle (26.8%) and diet and nutrition knowledge (15.4%) being the dominant reasons. Additional benefits involved increased awareness of the importance of making healthy dietary changes.

The next open-ended question asked which specific course activities the participants felt were effective in helping to increase their healthy dietary behaviors. Approximately one-quarter of the participants (n = 25, 24.3%) agreed that the curriculum activities involving diet analysis, food logs, and labs were beneficial in changing dietary behaviors. The diet analysis activity involved keeping a food log and then entering the information into a computer software program that analyzed the nutritional value of the foods and beverages entered. Additional curriculum activities that students found to be effective included information on health risks associated with unhealthy dietary behaviors, general nutrition information presented during class lectures, nutrition-related media (videos, YouTube clips), examples of healthy food choices, and the textbook chapter on nutrition.

Another qualitative question focused on ways the HRF course can increase healthy dietary behaviors among students. Participants agreed that the curriculum activities involving the diet analysis and food logs were beneficial; and approximately one-third of participants (n = 24, 31.6%) suggested including more information and examples of healthy foods, healthy food preparation methods, and healthy eating strategies. Other suggestions included teaching about the health consequences of an unhealthy diet, diet planning, and strategies for decreasing or eliminating fast food consumption and vending machine purchases (see Table 4).

The final qualitative question related to sustainability of healthy dietary behaviors. The top theme included tracking, practicing, and planning diet (n = 16, 16.3%), followed by motivation and support for healthier dietary habits (n = 15, 15.3%). Another theme emphasized the importance of continuing education and increased knowledge acquisition regarding proper nutrition and healthy eating along with constant reminders to focus on healthy eating (n = 13, 13.3%). A few participants (n = 5, 5.1%) also acknowledged the importance of personal responsibility in sustaining healthy dietary behaviors (see Table 5).

CONCLUSIONS

This study is unique because it is only one of a few studies conducted with the CC population that focused on the behavioral effects of a HRF course as well as student perceptions of the course. However, there are limitations to this study. External validity is limited by the study design of a pre- and post-test with a purposeful, nonrandom sample of CC students enrolled in a HRF course at one Texas CC; therefore, study results cannot be generalized. In addition, HRF course instructors had different teaching styles, which may have impacted how students learned. Nevertheless, possible learning differences were minimized by the fact that all HRF instructors, regardless of participation in this study, were required to follow the designated curriculum. Of the 400 total points possible in the course, only 55 points were at the instructors' discretion, thereby increasing internal validity of the study. Another limitation involves the use of student self-reported measures, which are subject to error and reporting bias. The selected survey questions are from the *College Student Health*

Survey, which has been administered to college populations since 1995 (Boynton Health Services, 2013). However, there are no reliability or validity data available. While efforts continue to enhance the accuracy of reporting dietary behaviors, additional methods (e.g., food records, 24-hour recall) can be used. These methods have various strengths and limitations and should be selected based on the research objectives, study design, and available resources (Shim, Oh, & Kim, 2014).

The study revealed that there was a lack of significant changes in FV consumption; therefore, additional course time and activities may be necessary to stimulate significant changes in student behaviors related to FV consumption. The increases in the mean scores for each of the five individual FV questions indicated some positive movement in the consumption of FV, yet more work is necessary if significant increases are to be achieved. Unfortunately, low consumption of FV is not uncommon as Moore and Thompson (2015) reported that adults eat only 1.0 fruit and 1.7 vegetables per day, with only 13.1% eating the recommended servings of fruit and 8.9% consuming the recommended servings of vegetables. Moreover, research by Boynton Health Services (2013) found that only 16% of two-year college students ate 5 or more FV per day. Research at the University of Texas at Austin found only 4.3% of their students consumed five or more servings of FV per day with 28% eating three to four servings per day, 58.6% eating one to two servings, and 9.1% consuming no servings (American College Health Association, 2018). In addition, Small, Bailey-Davis, Morgan, and Maggs (2013) reported that few college students actually consume the recommended amounts of FV or participate in optimal levels of PA. Both FV and PA levels declined across the seven semesters studied, and living off campus intensified the problem. Other research has shown that college students perceive they lack the knowledge and skills necessary to properly prepare healthier foods, which indicates there is the need to provide college students assistance in healthy meal planning and preparation (King, Ling, Ridner, Jacks, & Newton, 2013). In the current study, CC students noted similar gaps in knowledge and skills.

The statistically significant change in meal patterns (breakfast, fast food, restaurant eating) revealed additional practical significance. Reported changes in the participants' meal patterns from pre- to post-survey indicated moderate improvement in this area of dietary behaviors. Increases in breakfast eating with reductions in fast food consumption were encouraging as both represent desired outcomes to improve dietary behaviors. Important changes were reported for breakfast eating in zero days (8.4% pre vs. 2.6% post) and seven days (28.9% pre vs. 35.5% post), with the post-survey mean of 4.6 days per week. Weekly consumption of fast food dropped (60.6% pre vs. 47.4% post), while more limited consumption of a few times a year and one to two times per month increased (33.7% pre vs. 47.4% post). Participants in this study reported a post-survey mean for fast food of 3.55 days per week. As with fast food, weekly restaurant eating declined; and restaurant eating a few times per month increased. These results indicated participants were willing to practice moderation by reducing their consumption of fast food and restaurant eating, while not completely eliminating it.

Consumption of sugar-sweetened beverages also revealed statistical as well as practical significance. The medium effect size for improvements in sugar-sweetened beverage consumption from pre- to post-survey indicated that 10% of the variance in scores may have been related to participation in the HRF course. Mean scores for the individual categories of sports drinks, diet soda, fruit juices, and other sweetened beverages all declined with sports drinks declining significantly. The decreased consumption in four of the six areas within the sugar-sweetened beverage category indicated another positive outcome from this study as more information is now emerging about the health consequences of excessive sugar consumption, such as increased risk for cardiovascular disease, type 2 diabetes, obesity, and some cancers (Quinn & Lustig, 2011).

Additional research has documented that sugar consumption is problematic among young adults. For example, Ha and Powell (2013) reviewed consumption of sugar-sweetened beverages across time and among children, adolescents, young adults, and adults. The study found soda to be the most consumed sugar-sweetened beverage among both adolescents and young adults, even though consumption dropped over time. However, consumption of other sugary beverages

(sports/energy drinks) tripled; and heavy consumption was higher among low socio-economic populations and across some racial and ethnic populations. Another study revealed that 31% of young adults consumed sports drinks, and 18.8% consumed energy drinks weekly. Consumption of these beverages was also associated with other unhealthy dietary behaviors, including higher sugar-sweetened soda/fruit juice intake and lower breakfast consumption (Larson, Laska, Story, & Neumark-Sztainer, 2015). Furthermore, students in Minnesota community colleges, as compared to their four-year college peers, engaged in more unhealthy dietary behaviors such as higher ingestion of soda, fast food, and saturated fat; lower consumption of whole grains; and more skipped meals (Laska et al., 2011; Nelson, Larson, Barr-Anderson, Neumark-Sztainer, & Story, 2009). In light of this evidence, the newly adopted food label now includes the category "added sugars," which food manufacturers must include by July 26, 2018 (U.S. Food and Drug Administration, 2018). It is important to note that even though diet drinks use artificial sweeteners and are not technically sweetened with sugar, these drinks taste sweet; and the diet drink category was included in the Boynton survey used for this study. Furthermore, research has indicated that artificially sweetened beverages may actually promote weight gain by increasing appetite as well as the cravings for sugar. (Yang, 2010).

RECOMMENDATIONS

With the prevalence of chronic diseases and the rising costs of medical treatments, health researchers continue to emphasize the need for interventions targeting young adults to promote health education, teach healthy lifestyle behaviors, and provide skill development opportunities (Brunt, Rhee, & Zhong, 2008; Gordon-Larsen, Adair, Nelson, & Popkin 2004; King et al., 2013; Sparling, 2003). Therefore, a required HRF course in the college curriculum can be an effective intervention to target a large segment of young adults. Outcomes from this study indicated that the HRF course provided valuable information and strategies for helping influence healthy dietary behaviors among CC students. Nevertheless, additional research is needed to explore potential differences among different age groups, ethnicities, and genders as well as differences between CC and four-year college students. A positive, lasting influence on the health of college students is the ultimate goal of the HRF course. Therefore, longitudinal studies are needed to identify how HRF courses can improve health behaviors long-term. The use of focus groups can provide additional information related to students' perceptions and suggestions for improving the HRF course. Furthermore, unless college students are majoring in a health-related program, the HRF course is generally the *only* required course in the college curriculum focused on personal health and health behaviors. There is also mounting pressure on institutions of higher learning to meet rising expectations and implement rigorous evaluation methods associated with program reviews and accreditation. In turn, health and physical education faculty are called to critically evaluate their programs, courses, and curricula and make necessary changes to enhance student learning outcomes. Studies such as this one add to the body of knowledge and provide solid ideas for developing effective HRF courses.

The HRF course curriculum appears to be a sound start in promoting knowledge and skills and influencing healthy dietary behavior change among CC students. This type of instruction is consistent with other research showing that enrollment in a course focused on health significantly increased health knowledge, health interest, and participation in a variety of health behaviors (Finley & Vander Putten, 2014). In addition, sustainability of healthy dietary patterns is critical for long-term health (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2016). In the current study, student suggestions for sustainability included heightened instruction related to identifying, planning, and preparing healthier meals and snacks, motivation and support for healthy eating, as well as continued education about healthy dietary habits.

In another study conducted by Pelletier, Laska, Neumark-Sztainer, and Story (2013), reported that Minnesota college students who viewed alternative food production practices with high importance consumed more FV servings and fiber and consumed less added sugar and fat along with fewer sugar-sweetened beverages than their peers who possessed less favorable views of alternative food production. Students with favorable attitudes toward alternative food production practices also ate breakfast one more day per week and consumed fast food less

often than their counterparts. Based on these findings, including additional information about social and environmental implications related to food production can be a potential strategy to increase healthier dietary behaviors among young adults in college (Pelletier et al., 2013). Additionally, increased awareness about the positive influence of healthier behaviors on grade average (Wald, Muennig, O'Connell, & Garber, 2014) may serve as further motivation for college-aged students to adopt healthier behaviors.

Another finding from the current study involved a small percentage of study participants (n = 5, 6.6%) who suggested healthier options in campus vending machines. Changes in the campus dietary environment, such as healthy eating venues and vending machine selections, require administrative buy-in and full participatory support from the campus community. Incorporating environmental modifications can empower campus stakeholders (including students) to develop policies and collaborate with campus partners, such as vendors and local businesses, to offer a variety of healthy, inexpensive food and beverage options to support healthy campus eating. These collaborative strategies can also serve as experiential learning opportunities for students enrolled in health, business, and government classes. Furthermore, policy changes, environmental support, interpersonal collaboration, and individual behavior change are key components of an ecological framework that encompasses change at multiple levels of influence to support positive health behavior change. In particular, ecological strategies can effectively promote healthier eating and regular physical activity among college students (King et al., 2013). As Sallis and Owen (2015) asserted: "…it usually takes the combination of both individual-level and environmental- and policy-level interventions to achieve substantial positive changes in health behaviors that are maintained" (p. 44).

Based on participant responses in the current study, CC students desire more instructional time and specific strategies aimed to improve dietary behaviors. Experiential learning activities can be integrated to enhance retention of learning and develop students' self-efficacy for adopting healthy dietary behaviors. For example, collaborating with culinary arts, dietetic programs, and local chefs can provide students hands-on experience in healthy food preparation, including different ways to incorporate fruits and vegetables into the daily diet. Students can also rotate to different stations to taste samples and interact with instructors and peers, which fosters collaborative learning. Similarly, having students prepare healthy foods and bring the dishes and recipes to class can foster peer-to-peer teaching and learning. Another viable strategy involves teaching students how to purchase healthy foods inexpensively. A field experience at a local grocery store or farmers market can be a creative way for students to learn essential life skills related to shopping and meal preparation on a budget. Furthermore, teaching students to research and analyze the nutritional content of foods in restaurants and fast food establishments can help them make healthier choices when eating out. It is also worthwhile to address the effects of advertising on the perceived nutritional value of foods and beverages, which can foster critical thinking and media literacy skills related to understanding food labels and making wise food purchases. Additionally, inviting a registered dietician to an open Q & A session with students is an informal way to engage students that can result in increased learning and a better understanding of a career field linked to health and nutrition.

In a broader context, this study contributes to a category of research known as the Scholarship of Teaching and Learning (SoTL). SoTL applies research-based principles to teaching and learning and "has become a major force for transforming higher education" (Nelson, 2012, p. xi). SoTL involves the process of reflecting on one's teaching strategies, exploring additional evidence and research, and sharing the information publically. The intent of SoTL is to impact both teaching and student learning by adding to the knowledge base using formal, peer-reviewed communication (Georgia Southern University, Centers for Teaching and Learning, 2018). As such, the continuous cycle of research and practice promotes dialogue to build bridges between the two disciplines. This reciprocity benefits researchers, practitioners, and health education program participants (Glanz, Viswanath, & Rimer, 2015).

Overall, study findings revealed that the HRF course can effectively reach a large number of CC students and help them improve dietary behaviors. These findings, along with the

authors' recommendations, can aid health educators in planning, implementing, and evaluating HRF courses to contribute to SoTL, enrich the CC curriculum, and foster healthy behaviors among CC students. In turn, these outcomes can produce long-lasting benefits to individuals, campus communities, and the nation as a whole.

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Table 1: ***Means, Standard Deviations, and Significance for Dietary Behaviors of CC Students***

	Pre-Survey	Post-Survey	
Dietary Behaviors	Mean (SD)	Mean (SD)	Significance
FV			.643
100% Fruit Juice	1.18 (1.16)	1.51 (1.50)	.084
Fruit	2.18 (1.52)	2.33 (1.49)	.432
Potatoes	1.22 (0.96)	1.41 (1.17)	.192
Carrots	1.17 (1.19)	1.28 (1.18)	.408
Other Vegetables	2.30 (1.41)	2.33 (1.46)	.861
Meal Patterns*			.024*
Breakfast	4.18 (2.50)	4.64 (2.20)	.033*
Fast Food	3.76 (1.17)	3.55 (1.20)	.062
Restaurants	3.37 (1.07)	3.39 (.994)	.779
Sugar-Sweetened Beverages*			.045*
Soda	1.01 (1.13)	1.05 (1.15)	.658
Diet Soda	0.25 (.695)	0.18 (.582)	.357
Fruit Drinks	1.08 (1.22)	1.05 (1.19)	.862
Sports Drinks	1.04 (1.04)	0.75 (0.93)	.005*
Coffee Drinks	0.84 (1.13)	1.09 (1.16)	.058
Other Sweetened Beverages	1.07 (1.08)	1.00 (1.23)	.629

* = This difference was significant at $p \leq .05$.

Table 2: ***Percentages of Breakfast Eating Among CC Students***

Days per week	Pre-Survey %	Post-Survey %
0	**8.4**	**2.6**
1	12.0	3.9
2	13.3	17.1
3	8.4	11.8
4	6.0	9.2
5	13.3	13.2
6	9.6	6.6
7	**28.9**	**35.5**

Table 3: ***Percentages of Fast Food and Restaurant Eating Among CC Students***

	Fast Food		Restaurant	
Measurement Category	Pre-Survey %	Post-Survey %	Pre-Survey %	Post-Survey %
0	1.2	1.3	0	1.3
≤ 1/year	2.4	2.6	2.4	0
Few times/year	8.4	13.2	15.7	10.5
1-2/month	25.3	34.2	37.3	50.0
1/week	**25.7**	**21.1**	**28.9**	**25.0**
2+/week	**34.9**	**26.3**	**13.3**	**10.5**
Daily	0	1.3	2.4	2.6

Table 4: *Question 5: Suggestions for Increasing Healthy Dietary Behaviors* Among CC Students

Response (N=76)	Number of Responses	Percent of Responses
Diet curriculum activities (diet analysis, food log, labs)	13	17.1%
Increase healthy examples/How to prepare healthy foods	12	15.8%
Health influences and consequences	8	10.5%
Healthy eating strategies	6	7.9%
Increase nutrition information/time spent on topic	6	7.9%
Diet planning	5	6.6%
Decrease/eliminate fast food or vending machines	5	6.6%

Note. Only categories with 5 or more responses were included.

Table 5: *Question 6: Suggestions for Sustaining Healthy Dietary Behaviors Among CC Students*

Response (N=98)	Number of Responses	Percent of Responses
Track/practice/plan diet	16	16.3%
Motivation and support for healthier habits	15	15.3%
Continuing education and knowledge/Constant reminders	13	13.3%
Student responsibility	5	5.1%

Note. Only categories with 5 or more responses were included.