Article

THE NUTRITION ENVIRONMENT, FOOD CHOICES AND BODY IMAGE AMONG COLLEGE STUDENTS

Shadai Martin[1] and Ciro Velasco-Cruz[2]

Abstract:
Aim: The aim of this study was to assess the food and nutrition environment of a Southwest state college campus and to determine whether there is an association between the food and nutrition environment, food choices and body image.
Methods: Four surveys were used to collect all data: NEMS-P, SATAQ-3, SATAQ-4, and a demographic survey. NEMS-P was used to assess the food and nutrition environment, SATAQ-3 was used to assess societal influences on body image and SATAQ-4 was used to assess internalization of appearance ideals and appearance pressures (n=188).
Results: There was a significant association between college students being both unhappy with their shape and weight and grocery shopping with weight control in mind ($p < 0.05$). There was a significant association between freshmen and sophomore students being unhappy with their weight and higher occurrences of eating at "healthier" restaurants ($p<0.01$). Students having more fruit, vegetables and whole grains available and less occurrences of trying to cut down on food to control weight or shape was statistically significant at 10% but was not statistically significant at 5% ($p=0.48$).
Conclusion: Assessing the campus food and nutrition environment identifies opportunities for improvement and begins a planning process for creating a nutrition environment that supports students in making healthy choices, identify weight management opportunities and potentially reduce barriers to healthy behaviors on the college campus.

INTRODUCTION

The food and nutrition environment which includes places in various communities where people purchase and consume food has the potential to influence food choices and eating behaviors (Herforth & Ahmed, 2015). The food and nutrition environment not only influence what is consumed and the quality of diets, but also diet-related health outcomes (Glanz et al., 2005). Healthy food environments provide fair access to healthy foods and provide community programs and infrastructure to support healthy eating (Glanz et al., 2005; Steenhuis et al., 2011). Price, policy, and food availability also influence the nutrition environment; cost has been reported as one of the most important factors in food decisions behind taste (Steenhuis et al., 2011).

[1]Department of Family and Consumer Sciences, New Mexico State University
[2]Department of Extension Plant Sciences, New Mexico State University

Correspondence may be sent to Shadai Martin via email at ssmartin@nmsu.edu

Various factors may influence food purchasing and dietary intake on and around the college campus. Some of these factors include lifestyle choices, income, mode of transportation, and distance to the stores, but the widespread availability of sugary drinks and high- fat salty snacks in schools and universities continues to be a health concern (Glanz et al., 2005; Steenhuis et al., 2011).

Yearly, many new college students make the choice between living on or off campus, with many going to a different state or country from what they have known throughout their childhood or high school years. Preparing nutritious meals can become difficult living in a dorm-room or a small apartment with only a mini-fridge, microwave and hot-plate, compounded with the issue of food insecurity that affect some college students (Bernardo et al., 2017; Sogari et al., 2018). Many students arrive to their respective college campus' with limited cooking experiences; a new food environment, new courses and new relationships which students now have to navigate on their own adds another layer of stress (Abraham et al., 2018; Wilson et al., 2017; Garett et al., 2017). Having fast food from campus grills, fast food restaurants surrounding and on the campus, and snacks from vending machines more readily accessible, students eating behaviors and habits may be influenced in a manner that may be potentially detrimental to their health (Garett et al., 2017; Boekeloo et al., 2011; Dingman et al., 2014). Students are often offered meal plans; some universities even make it mandatory to purchase a meal plan, particularly those students residing on campus. (Dhillon et al., 2019; Leischner et al., 2018; Vadeboncoeur et al., 2015). It is known that college students (20-29) consume at least one fast food meal weekly; some students consume fast food up to six to eight times weekly. College students consume fast food 70% more often than adults not attending college in the same community (Vadeboncoeurr et al., 2015; Richardson et al., 2009; Monroe at al., 2017).

The college years, particularly for traditional college students (18-22 years old), is important for developing healthy eating habits that will help maintain a healthy body and lifestyle that promotes healthy behaviors into adulthood (Sogari et al., 2018). A poor body image can affect a person in many ways, including academic performance and overall quality of life, however, having a positive body image can make a person more resilient to the development of an eating disorder. Having healthy and affordable food available in food retail and service settings on campus has the potential to allow students and individuals to make healthy food choices (Dhillon et al., 2019; Gerend, 2009; Tseng et al., 2016). Limited choices of healthy food causes individuals to settle for foods higher in caloric value but lower in nutritional values (Dingman et al., 2014; Dhillon et al., 2019). Other factors such as a lack of personal, non-public transportation may influence the food choices of college students. Some students have no personal vehicle and must rely on public transportation, walking, a bicycle, or their social network to provide transport or to purchase food. Having convenient or reasonable access to supermarkets is often associated with healthier diets and lower risk of obesity amongst community members (Anderson et al., 2014; Engler-Stringer et al., 2014).

Many freshmen, particularly during their first semester, gain a significant amount of weight, and for many students, the weight gain continues throughout their college career (Dhillon et al., 2019; Leischner et al., 2018). If sustained, students may potentially become overweight/obese and also develop heath issues related to being overweight/obese. The food environment has been cited as one of the main causes of the obesity epidemic (Herforth et al., 2015; Anderson et al., 2014). However, the relationship between weight gain, obesity and eating disorders and their relative cause is complicated as food availability, choices and consumption affects each individual differently. Assessing the food environment on college campuses, its influences on food choices and body image is important as it identifies opportunities for improvement and begins a planning process for making the college campuses even healthier. There has been studies and interventions geared toward assessing and improving the nutrition environment, but in an effort to create long term, sustainable changes in the food and nutrition environment that will lead to healthy habits and promote body positivity, a comprehensive understanding of the college food and nutrition environment is needed (Herforth et al., 2015; Tseng et al., 2016; Engler-Stringer et al., 2014). The aim of this study was to assess the food and nutrition environment of a Southwest's state college campus, and to determine whether there is an association between the food and nutrition environment, food choices and body image among college students. This paper seeks to answer the following questions:

1. Is there an association between food choices, grocery shopping, the nutrition environment and body image (weight and shape) among college students (freshmen, sophomore, juniors, and seniors)?

ISSN 2651-6837

2. Is there an association between the types of restaurants eaten at most often and body image (weight and shape) among college students (freshmen, sophomore, juniors, and seniors)?

METHODOLOGY

Data Collection

Two trained facilitators aided students in completing a food environment survey (NEMS-P), a body image questionnaire (comprised of SATAQ-3 & SATAQ-4) and a demographic survey which included questions regarding education, location and housing. NEMS-P is a 49 question tool survey that records the interpretation of the community nutrition environment, consumer nutrition environment, home food environment, food shopping behaviors, eating behaviors and background characteristics of the person who does most of the food shopping (Green & Glanz, 2015). The Body Image Questionnaire was comprised of the Social Attitudes Towards Appearance Scale-3 (SATAQ-3) and Social Attitudes Towards Appearance Scale-4(SATAQ-4) (Thompson et al., 2004; Schaefer et al., 2017). SATAQ-3 is a measure of acceptance of societal appearance ordeals and was used to assess body image and eating disturbances (Thompson et al., 2004). SATAQ-4 is a measure of internalization of appearance ideals and appearance pressures and was also used to assess body image (Schaefer et al., 2017).

NEMS-P, SATAQ-3 and SATAQ-4 have undergone validation from multiple experts in different fields (Green & Glanz, 2015; Franko et al., 2012; Warren et al., 2013). Test-re-test reliability for core constructs of the perceived nutrition environment in the NEMS-P survey was moderate to good (Cronbach's alpha=0.52-0.83); NEMS-P can differentiate the perception of the nutrition environment between residents of higher and lower socioeconomic neighborhoods (Green & Glanz, 2015). SATAQ-3 is one of the most commonly used self-reported measure of Western appearance ideals and has demonstrated adequate score reliability and validity among Latina college students (Franko et al., 2012; Warren et al., 2013). SATAQ-4 scale scores have demonstrated great reliability and convergent validity with measures of body image, eating disorders and self-esteem (Schaefer et al., 2015). Students who were currently enrolled at the college campus and possessed a student identification number were invited to participate; participation was completely voluntary. 188 college students from a Southwest state college campus were included in this study.

Ethical Consideration

This study follows the university's ethics review board; ethical clearance was submitted to the Southwest state university's institutional review board and was approved. Informed consent was prepared and given to all participants in this study.

Data Analysis

Data were analyzed using SAS Institute Inc (SAS institute Inc., 2018). SAS proc corr. was used to analyze continuous variables and Chi square test was used to analyze categorial variables using SAS proc freq. (SAS institute Inc., 2018). Pearson correlation and Spearman correlation were used to assess whether there was an association between students between food choices, grocery shopping, the nutrition environment and body image (weight and shape) among college students (freshmen, sophomore, juniors, and seniors).

Pearson correlation and Spearman correlation were used to determine whether there was an association between restaurants eaten at most often and body image among (weight and shape) among college students (freshmen, sophomore, juniors, and seniors).

RESULTS

Overall, there was a significant association between college students (freshmen, sophomore, junior and senior students combined) being unhappy with their shape and weight and grocery shopping with weight control in mind ($p < 0.05$). There was a significant association with freshmen and sophomore students being unhappy with their shape

ISSN 2651-6837

and weight and grocery shopping with weight control in mind (freshmen = $p < 0.01$, sophomore = $p< 0.01$); no significant associations were seen among junior and senior students (Tables 1-4).

Table 1. Body image and food choices among freshmen students

Pearson Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations			
	Unhappy with weight	**Unhappy with shape**	**Concerned-nutritional content**
Unhappy with weight	1.00000 109	0.77848 <.0001 109	0.15110 0.1168 109
Unhappy with shape	0.77848 <.0001 109	1.00000 109	0.25105 0.0085 109
Concerned- nutritional content	0.15110 0.1168 109	0.25105 0.0085 109	1.00000 110
Grocery shopping – taste is important	-0.09886 0.3065 109	0.04823 0.6184 109	0.13942 0.1463 110
Grocery shopping – nutrition is important	-0.03761 0.6978 109	0.01883 0.8459 109	0.36208 0.0001 110
Grocery shopping- cost is important	0.12192 0.2066 109	0.24459 0.0104 109	0.10558 0.2723 110
Grocery shopping – convenience is important	0.19904 0.0380 109	0.12158 0.2079 109	-0.15943 0.0962 110
Grocery shopping - weight control is important	0.22982 0.0162 109	0.26967 0.0046 109	0.32553 0.0005 110
Fruit consumption	0.19428 0.0429 109	0.16494 0.0865 109	-0.07375 0.4439 110
Fruit juice consumption	0.10418 0.2810 109	0.09894 0.3061 109	0.02914 0.7625 110
Vegetable consumption	0.08845 0.3604 109	0.04577 0.6365 109	-0.16580 0.0834 110
Vegetable juice consumption	0.13746 0.1541 109	0.09547 0.3234 109	-0.19955 0.0366 110

ISSN 2651-6837

Table 2. Body image and food choices among sophomore students

Pearson Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations			
	Unhappy with weight	**Unhappy with shape**	**Concerned-nutritional content**
Unhappy with weight	1.00000 46	0.77825 <.0001 46	0.11218 0.4580 46
Unhappy with shape	0.77825 <.0001 46	1.00000 46	0.10196 0.5002 46
Concerned - nutritional content	0.11218 0.4580 46	0.10196 0.5002 46	1.00000 47
Grocery shopping -taste is important	0.05028 0.7400 46	0.12522 0.4070 46	-0.36954 0.0106 47
Grocery shopping-nutrition is important	-0.16300 0.2791 46	-0.05565 0.7134 46	0.49994 0.0003 47
Grocery shopping -cost is important	0.18876 0.2090 46	0.32301 0.0286 46	0.13576 0.3629 47
Grocery shopping – convenience is important	0.29118 0.0496 46	0.21118 0.1589 46	-0.01606 0.9147 47
Grocery shopping – weight control is important	0.52029 0.0002 46	0.42832 0.0030 46	0.16845 0.2577 47
Fruit consumption	-0.06257 0.6796 46	-0.11962 0.4285 46	-0.23813 0.1070 47
Fruit juice consumption	0.34357 0.0194 46	0.36553 0.0125 46	0.22541 0.1277 47
Vegetable consumption	0.06986 0.6446 46	0.02698 0.8587 46	-0.10753 0.4719 47
Vegetable juice consumption	0.04586 0.7622 46	-0.06505 0.6676 46	-0.18333 0.2174 47

ISSN 2651-6837

Table 3. Body image and food choices among junior students

Pearson Correlation Coefficients, N = 16 Prob > |r| under H0: Rho=0			
	Unhappy with weight	**Unhappy with shape**	**Concerned-nutritional content**
Unhappy with weight	1.00000	0.86261 <.0001	0.00000 1.0000
Unhappy with shape	0.86261 <.0001	1.00000	0.16001 0.5539
Concerned- nutritional content	0.00000 1.0000	0.16001 0.5539	1.00000
Grocery shopping – taste is important	0.06356 0.8151	0.02388 0.9301	-0.19681 0.4650
Grocery shopping – nutrition is important	0.17817 0.5091	0.23054 0.3903	0.34151 0.1955
Grocery shopping -cost is important	0.41574 0.1093	0.48339 0.0578	0.07881 0.7717
Grocery shopping convenience is important	0.12172 0.6534	0.28958 0.2766	0.26919 0.3134
Grocery shopping – weight control important	0.23570 0.3795	0.29514 0.2671	0.62554 0.0096
Fruit Consumption	0.05304 0.8453	0.04649 0.8643	-0.38318 0.1429
Fruit Juice Consumption	0.10770 0.6914	0.21307 0.4282	-0.10480 0.6993
Vegetable Consumption	0.23462 0.3818	0.08814 0.7455	-0.17296 0.5218
Vegetable Juice Consumption	-0.35656 0.1752	-0.18094 0.5025	-0.12451 0.6459

ISSN 2651-6837

Table 4. Body image and food choices among senior students

Pearson Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations			
	Unhappy with weight	**Unhappy with shape**	**Concerned - nutritional content**
Unhappy with weight	1.00000 8	0.73030 0.0397 8	-0.06667 0.8754 8
Unhappy with shape	0.73030 0.0397 8	1.00000 8	-0.36515 0.3738 8
Concerned- nutritional content	-0.06667 0.8754 8	-0.36515 0.3738 8	1.00000 9
Grocery shopping- taste is important	-0.09759 0.8182 8	0.00000 1.0000 8	-0.39528 0.2924 9
Grocery shopping - nutrition is important	-0.20000 0.6349 8	-0.36515 0.3738 8	0.63246 0.0676 9
Grocery shopping -cost is important	0.51640 0.1901 8	0.35355 0.3903 8	0.35000 0.3558 9
Grocery shopping– convenience is important	0.37687 0.3574 8	0.29488 0.4783 8	0.33541 0.3776 9
Grocery shopping - weight control important	0.23187 0.5806 8	0.00000 1.0000 8	0.25298 0.5113 9
Fruit consumption	0.59222 0.1219 8	0.58977 0.1238 8	0.08305 0.8318 9
Fruit juice consumption	0.20620 0.6242 8	0.37647 0.3580 8	0.22361 0.5630 9
Vegetable Consumption	0.38730 0.3432 8	0.17678 0.6754 8	0.64984 0.0582 9
Vegetable Juice Consumption	0.86667 0.0053 8	0.54772 0.1599 8	-0.02712 0.9448 9

ISSN 2651-6837

There was a significant association between freshmen and sophomore student's being unhappy with their weight and higher occurrences of eating at "healthier" restaurants ($p<0.05$). Overall, students having more fruit, vegetables and whole grains available and less occurrences of trying to cut down on food to control weight or shape was statistically significant at 10%, but was not statistically significant at 5%, estimate value equal to 0.488 ($p\leq 0.0645$). There was a significant association between freshmen and sophomore student's having more fruits, vegetables and whole grain available and less occurrences of trying to cut down on food to control weight or shape (freshmen = $p<0.05$, sophomore=$p<0.05$); no significant associations were seen among junior and senior students (Table 5 & 6).

Table 5. Fruit, vegetable, grain consumption and weight control among freshmen and sophomore students

Freshmen **Spearman Correlation Coefficients, N = 110** **Prob > |r| under H0: Rho=0**					
	Fruit	**Veggies**	**grains**	**Fruit-Veg.-Grains**	**Cut Down Food**
Fruit	1.00000	0.53174 <.0001	0.37580 <.0001	0.76858 <.0001	-0.19811 0.0380
Veggies	0.53174 <.0001	1.00000	0.57521 <.0001	0.89819 <.0001	-0.07244 0.4520
grains	0.37580 <.0001	0.57521 <.0001	1.00000	0.75210 <.0001	-0.08525 0.3759
Fruit- Veg.-Grains	0.76858 <.0001	0.89819 <.0001	0.75210 <.0001	1.00000	-0.14568 0.1289
Cut Down Food	- 0.19811 0.0380	-0.07244 0.4520	- 0.08525 0.3759	-0.14568 0.1289	1.00000
Sophomore **Spearman Correlation Coefficients** **Prob > |r| under H0: Rho=0** **Number of Observations**					
	Fruit	**Veggies**	**grains**	**Fruit-Veg.-Grains**	**Cut Down Food**
Fruit	1.0000 0 47	0.32391 0.0263 47	0.2782 7 0.0582 47	0.76214 <.0001 47	0.04517 0.7656 46
Veggies	0.3239 1 0.0263 47	1.00000 47	0.0813 3 0.5868 47	0.74503 <.0001 47	0.09639 0.5240 46
grains	0.2782 7 0.0582 47	0.08133 0.5868 47	1.0000 0 47	0.54075 <.0001 47	0.02843 0.8512 46
Fruit Veg. Grains	0.7621 4 <.0001 47	0.74503 <.0001 47	0.5407 5 <.0001 47	1.00000 47	0.09296 0.5389 46
Cut Down Food	0.0451 7 0.7656 46	0.09639 0.5240 46	0.0284 3 0.8512 46	0.09296 0.5389 46	1.00000 46

ISSN 2651-6837

Table 6. Fruit, vegetable, grain consumption and weight control among junior and senior students

Juniors Spearman Correlation Coefficients, N = 16 Prob > |r| under H0: Rho=0					
	Fruit	**Veggies**	**Grains**	**Fruit-Veg. -Grains**	**Cut Down Food**
Fruit	1.00000	0.35635 0.1755	0.32898 0.2134	0.60020 0.0140	0.30284 0.2542
Veggies	0.35635 0.1755	1.00000	0.56622 0.0222	0.90467 <.0001	-0.21677 0.4200
grains	0.32898 0.2134	0.56622 0.0222	1.00000	0.75872 0.0007	-0.07277 0.7888
Fruit Veg.-Grains	0.60020 0.0140	0.90467 <.0001	0.75872 0.0007	1.00000	-0.05728 0.8331
Cut Down Food	0.30284 0.2542	-0.21677 0.4200	- 0.07277 0.7888	-0.05728 0.8331	1.00000
Seniors **Spearman Correlation Coefficients, N = 9** **Prob > |r| under H0: Rho=0**					
	Fruit	**Veggies**	**Grains**	**Fruit-Veg.- Grains**	**Cut Down Food**
Fruit	1.00000	0.57220 0.1074	- 0.23810 0.5373	0.74140 0.0222	-0.59517 0.0909
Veggies	0.57220 0.1074	1.00000	0.05774 0.8827	0.91629 0.0005	0.17982 0.6434
grains	- 0.23810 0.5373	0.05774 0.8827	1.00000	0.18661 0.6307	0.11022 0.7777
Fruit- Veg-grains	0.74140 0.0222	0.91629 0.0005	0.18661 0.6307	1.00000	-0.05136 0.8956
Cut Down Food	- 0.59517 0.0909	0.17982 0.6434	0.11022 0.7777	-0.05136 0.8956	1.00000

DISCUSSION

The college campus nutrition environment has the potential to shape and influence lifelong healthy behaviors. Although strides have been made in creating a supportive nutrition environment on college campuses, it is important to continually evaluate how students perceive the nutrition environment and how it affects them in an effort to create an environment of optimal support. In this present study, we assessed the food and nutrition environment of a South-west's state college campus and its association between food choices and body image.

More research is needed to understand why there was a significant positive association between students having more fruits, vegetables and whole grains available and less occurrences of trying to cut down on food to control weight and shape. However, studies have demonstrated that diet is the most important factor that influences the stability of body weight (Carels et al., 2008; Schwingshack et al., 2015). Low fast-food consumption, adherence to a low-fat diet, low sugar sweetened beverage consumption and adequate consumption of fruits and vegetables are

ISSN 2651-6837

some behaviors that have been found successful with weight maintenance and/or weight loss (Carels et al., 2008; Schwingshack et al., 2015). Most fruits and vegetables are low in energy density due to their high water and fiber content and their low-fat content. Lower consumption of processed food and refined carbohydrates has been found to be associated with higher fruit and vegetable consumption and in turn, has been shown to reduce weight gain in all body types (Schwingshack et al., 2015). Convenience and accessibility are also key factors in influencing student food selection. Having healthy and affordable options available allows people to make healthier food choices. (Dingman et al., 2014; Dhillon et al., 2019). When healthy foods are unavailable, high caloric, low nutrient dense foods will become the option individuals will most likely choose (Dhillon et al., 2019).

Food literacy is also an important factor to being able to choose or make healthy food choices. Certain knowledge, skills and behaviors are needed to plan, select and prepare healthy meals. College is an apt time to take a nutrition course; understanding the impact of nutrition on health and being able to navigate the campus nutrition environment is important for leading a healthy lifestyle (Bernardo et al., 2017).

In this study, 54% of freshmen, 56% of seniors, 47% of juniors and 42% of sophomore's indicated that their weight sometimes affected how they feel about themselves, whilst 26% of freshmen, 33% of seniors, 24% of juniors and 33% of sophomore's indicated that their weight quite often affected how they feel about themselves. More research is needed to understand why a significant association was seen between college students being unhappy with their weight and shape and grocery shopping with weight control in mind. Individuals who experience body dissatisfaction may suffer from feelings of depression, isolation, and low self-esteem (Carels et al., 2008). Although there is no single cause for developing an eating disorder, experiencing body dissatisfaction is the best-known contributor for the development of anorexia and bulimia (Fragkos & Frangos, 2013). Eating disorders have the potential to negatively impact academic achievements and overall grade point averages. Students with eating disorders often experience difficulty concentrating, irritability, and lack of energy, which has the potential to lead to increased absences and lower academic performance (Yanover & Thompson, 2018; Adelantado-Renau et al., 2018).

Restaurants located on and surrounding the college campus also make-up the college nutrition environment. Of the restaurants available on or around the college campus in this study, sit-down restaurants, fast-food and combination style restaurant visits were assessed. 64% of freshmen, 33% of sophomores, 59% of juniors and 57% of seniors reported eating at fast food restaurants most often, and 48% of freshmen, 31% of sophomores, 47% juniors and 11% of seniors reported having to walk only 10 minutes or less from the campus to acquire fast food. A typical fast food meal and sit-down restaurant meal tend to be extremely high in fat and calories (Krukowski et al., 2006). It has been shown that "sit-down" restaurant meals on average contain 1307 calories and the average fast-food meal contains approximately 809 calories which is approximately half to three-fourths of the calories an individual should consume daily (Krukowski et al., 2006; Nago et al., 2014). An obesogenic nutrition environment which promotes excess consumption of processed foods has the potential to displace the consumption of healthier foods and promote eating disorder behavior (Corsica & Hood, 2011).

Using policy to support having increased availability of healthy food choices and for obesity prevention could potentially be a successful way to create a supportive food and nutrition environment on the college campus (Chirqui, 2013). Mandating food labelling/nutrition facts panel for snacks and meals across the entire campus, limiting soda or limiting soft drink sizes and refills, marketing fruit and vegetables via posters or even making fruit and vegetables cheaper than "junk food" could also potentially be successful ways to provide a supportive food and nutrition environment on the college campus (Cameron, 2018). Having a nutrition course available to all college students that assists with navigating the nutrition environment could also be potentially a successful way to assist students with making "healthier" choices on campus. Evaluating shelf-space and placement given to healthier food options at campus convenience stores and grills, and product promotion are other important areas where assessments can be done in an effort to make strides in improving the food and nutrition environment on the college campus (Cameron, 2018).

Limitations

This study is not without limitations. All college students were not represented in the food choices and body image data. Every college campus' nutrition environment is not identical to those in a Southwest state; replicating this

ISSN 2651-6837

study on multiple college campuses would improve the generalizability of this study. This survey study was conducted for one semester; conducting this survey study for multiple semesters would allow for consistently assessing the nutrition environment and also the relationship between the nutrition environment and body image among college students. Despite these limitations, there are very few studies that address the nutrition environment and its association with food choices and body image on the college campus.

CONCLUSION

A healthy campus food and nutrition environment has the potential to make healthy choices easier. Assessing the campus nutrition environment provides valuable information that has the potential to positively shape/create a nutrition environment that supports students in making healthy choices, identify weight management opportunities, and also potentially reduce barriers to healthy behaviors on the college campus. The campus nutrition environment can provide students the opportunity to learn about and practice healthy eating through available foods and beverages, nutrition education and messages about nutrition in the cafeteria/food service areas and throughout the college campus which could also in turn improve students' self-esteem, self-efficacy and academic achievements.

REFERENCES

Abraham, S., Noriega, B., & Shin, J. (2018). College students eating habits and knowledge of nutritional requirements. *Journal of Nutrition and Human Health*, *2*(1),13-17. https://doi.org/10.35841/nutrition-human-health.2.1.13-17

Adelantado- Renau, M., Beltran-Valls, M., & Toledo-Bonifas, M. (2018). The risk of eating disorders and academic performance in adolescents: DADOS study. *Nutricion Hospitalaria, 35*(5), 1201-1207. http://dx.doi.org/10.20960/nh.1778

Anderson, E., Martins, P., & Gittelsohn, J. (2014). Changing the Food Environment for Obesity Prevention: Key Gaps and Future Directions. *Current Obesity Reports, 3*(4), 451–458. https://doi.org/10.1007/s13679-014-0120-0

Bernardo, G., Jomori, M., & Fernandes, A. (2017). Nutrition and culinary in the kitchen program: a randomized controlled intervention to promote cooking skills and healthy eating in university students-study protocol. *Nutrition Journal, 16*,83. https://doi.org/10.1186/s12937-017-0305-y

Boekeloo, B., Novik, M., & Bush, E. (2011). Drinking to get drunk among incoming college freshmen students. *American Journal of Health Education, 42*(2), 88-95. https://doi.org/10.1080/19325037.2011.10599176

Cameron, A. (2018). The shelf space and strategic placement of healthy and discretionary foods in urban, urban-fringe and rural/non-metropolitan Australian supermarkets. *Public Health Nutrition, 21*(3), 593-600. https://doi.org/10.1017/s1368980017003019

Carels, R., Konrad, K. & Young, K. (2008). Taking control of your personal eating and exercise environment: A weight maintenance program. *Eating Behaviors*, *9*(2), 228–37. https://doi.org/10.1016/j.eatbeh.2007.09.003

Chirqui, J. (2013). Obesity prevention policies in U.S. states and localities: a lesson from the field. *Current Obesity Reports*, *2*(3), 200-210. https://dx.doi.org/10.1007%2Fs13679-013-0063-x

Corsica, J., & Hood, M. Eating disorders in an obesogenic environment. (2011). *Journal of the Academy of Nutrition & Dietetics, 111*(7), 996-1000. https://doi.org/10.1016/j.jada.2011.04.011

Dhillon, J., Rios, L., & Aldaz, K. (2019). We don't have a lot of healthy options: food environment perceptions of first-year, minority college students attending a food desert campus. *Nutrients, 11*(4), 816. https://doi.org/10.3390/nu11040816

ISSN 2651-6837

Dingman, D., Schulz, A., & Wyrick, D. (2014). Factors related to the number of fast food meals obtained by college meal plan students. *Journal of American College Health, 62*(8), 562-569. https://doi.org/10.1080/07448481.2014.945456

Engler-Stringer, R., Le, H., & Gerrard, A. (2014). The community and consumer food environment and children's diet: a systematic review. *BMC Public Health,* (14), 522. https://doi.org/10.1186/1471-2458-14-522

Fragkos, K., & Frangos, C. (2013). Assessing eating disorder risk: the pivotal role of achievement anxiety, depression and female gender in non-clinical samples. *Nutrients 5*(3), 811-828. https://doi.org/10.3390/nu5030811

Franko, D., Jenkins, A., Roehrig, J., Luce, K., Crowther, J., Rodgers, R. (2012). Psychometric properties of measures of eating disorder risk in Latina college women. *International Journal of Eating Disorder*, *45*(4), 592-596. https://doi.org/10.1002/eat.20979

Garett, R., Liu, S., & Young, S. (2017). A longitudinal analysis of stress among incoming college freshman. *Journal of American College Health, 65*(5), 331-338. https://doi.org/10.1080/07448481.2017.1312413

Gerend, M. (2009). Does calorie information promote lower calorie fast food choices among college students? *Journal of Adolescent Health, 44*(1), 84–86. https://doi.org/10.1016/j.jadohealth.2008.06.014

Glanz, K., Sallis, J., & Saelens, B. (2005). Healthy Nutrition Environments: Concepts and Measures. *American Journal of Health Promotion, 19*(5), 330-333. https://doi.org/10.4278/0890-1171-19.5.330

Green, S., Glanz, K. (2015). Development of the perceived nutrition environment measures survey. *American Journal of Preventive Medicine, 49* (1), 50-61. https://doi.org/10.1016/j.amepre.2015.02.004

Herforth, A. & Ahmed, S. (2015). The food environment, its effects on dietary consumption and potential for measurements within agriculture-nutrition interventions. *Food Security*, *7*(3), 505-20. https://doi.org/10.1007/s12571-015-0455-8

Keranen, A., Savolainen, M., & Reponen, A. (2009). The effect of eating behavior on weight loss and maintenance during a lifestyle intervention. *Preventative Medicine,* 49, 32–8. https://doi.org/10.1016/j.ypmed.2009.04.011

Krukowski, R., Harvey-Berino, J., & Kolodinsky, J. (2006). Consumers may not use or understand calorie labeling in restaurants. *Journal of American Dietetic Association, 106*(6), 917–920. https://doi.org/10.1016/j.jada.2006.03.005

Leischner, K., McCormack, L., & Britt, B. (2018). The healthfulness of entrée and students' purchases in a university campus dining environment. *Healthcare, 6*(2), 28. https://doi.org/10.3390/healthcare6020028

Monroe, C., McGrievy, G., & Larsen, C. (2017). College freshmen students' perspectives weight gain prevention in the digital age: web-based survey. *JMIR Public Health Surveill*ance, *3*(4), 71. http://doi.org/10.2196/publichealth.7875

Nago, E., Lachat, C., & Dossa, R. (2014). Association of out-of -home eating with anthropometric changes; a systematic review of prospective studies. *Critical Reviews in Food Science and Nutrition*, 54, 1103-1116

Richardson, E., Bailey, S., & Fava, J. (2009). A prospective study of weight gain during the college freshman and sophomore years. *Preventative Med, 48*(3), 256-261. https://doi.org/10.1016/j.ypmed.2008.12.009

SAS Institute Inc. 2018. SAS/STAT® 15.1 User's Guide. Cary, NC: SAS Institute Inc.

ISSN 2651-6837

Schaefer, L., Burke, N., Thompson, J., Dedrick, R., Heinberg, L., Cologero, R., Bardon-Cone, A., Higgins, M., Frederick, D., Kelly, M., Anderson, D., Schaumberg, K., Nerini, A., Stefanile, C., Dittmar, H., Clark, E., Adams, Z., Macwana, S., Klump, K., Vercellone, A., Paxton, S., Swami, V. (2015). Development and validation of the sociocultural attitudes towards questionnaire-4 (SATAQ-4). *Psychological Assessment, 27* (1), 54-67. https://doi.apa.org/doi/10.1037/a0037917

Schaefer, L., Harriger, J., & Heinberg L. (2017). Development and validation of the sociocultural attitudes towards appearance questionnaire-4-revised(SATAQ-4R). *International Journal of Eating Disorders*, *50*(2), 104-117.

Schwingshackl, L., Hoffmann, G., & Kalle-Uhlmann, T. (2015). Fruit and Vegetable Consumption and Changes in Anthropometric Variables in Adult Populations: A Systematic Review and Meta-Analysis of Prospective Cohort Studies. *PLOS One*, *10*(10), 0140846. https://doi.org/10.1371/journal.pone.0140846

Sogari, G., Velez-Argumedo, C., & Gomez, M. (2018). College students and eating habits: a study using an ecological model for healthy behavior. *Nutrients, 10*(12), 1823. https://doi.org/10.3390/nu10121823

Steenhuis, I., Waterlander, W., & de Mul, A. (2011). Consumer food choices: the role of price and pricing strategies. *Public Health Nutrition, 14*(12), 2220-2226. https://doi.org/10.1017/ /S1368980011001637

Thompson, J., Van den berg, P., & Roehrig, M. (2014). The sociocultural towards appearance scale-3 (SATAQ-3): development and validation. *International Journal of Eating Disorders*, *35*(3), 293-304. https://doi.org/10.1002/eat.10257

Tseng, M., DeGreef, K., & Fishler, M. (2016). Assessment of a University Campus Food Environment, California 2015. *Preventing Chronic Disease,*13,18. http://dx.doi.org/10.5888/pcd13.150455

Vadeboncoeur, C., Townsend, & N., Foster, C. (2015). A meta-analysis of weight gain in first year university students: is freshmen 15 a myth? *BMC Obesity*, (2),22. https://doi.org/10.1186/s40608-015-0051-7

Warren, C., Gleaves, D., & Rakhovskaya, L. (2013). Score reliability and factor similarity of the sociocultural attitudes towards questionnaire -3 (sataq-3) among four ethnic groups. *Journal of Eating Disorder,* (1),14. https://doi.org/10.1186/2050-2974-1-14

Wilson, C., Matthews, J., & Seabrook, J. (2017). Self-reported food skills of university students. *Appetite, 108*(1), 270-276. https://doi.org/10.1016/j.appet.2016.10.011

ISSN 2651-6837