Research Article

Systematic Review of Dietary Interventions With College Students: Directions for Future Research and Practice

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ABSTRACT

Objective: To clarify directions for research and practice, research literature evaluating nutrition and dietary interventions in college and university settings was reviewed.

Design: Systematic search of database literature.

Setting: Postsecondary education.

Participants: Fourteen research articles evaluating randomized controlled trials or quasi-experimental interventions targeting dietary outcomes.

Main Outcome Measures: Diet/nutrition intake, knowledge, motivation, self-efficacy, barriers, intentions, social support, self-regulation, outcome expectations, and sales.

Analysis: Systematic search of 936 articles and review of 14 articles meeting search criteria.

Results: Some in-person interventions (n = 6) show promise in improving students' dietary behaviors, although changes were minimal. The inclusion of self-regulation components, including self-monitoring and goal setting, may maximize outcomes. Dietary outcomes from online interventions (n = 5) were less promising overall, although they may be more effective with a subset of college students early in their readiness to change their eating habits. Environmental approaches (n = 3) may increase the sale of healthy food by serving as visual cues-to-action.

Conclusions and Implications: A number of intervention approaches show promise for improving college students' dietary habits. However, much of this research has methodological limitations, rendering it difficult to draw conclusions across studies and hindering dissemination efforts.

Key Words: nutrition, diet, health, college, university (*J Nutr Educ Behav*. 2013;45:304-313.)

INTRODUCTION

The transition to college can pose significant challenges to healthy eating.[1] Some students have difficulty with the responsibilities of purchasing and preparing their own meals and managing new eating schedules. Students also express concern about the cost of healthy food,[1] and they report preferring processed snacks vs fresh produce, which spoils more quickly.[2] Additional social and environmental factors, including limited access to healthy food and limited peer support for eating well, may negatively influence students' dietary habits.[2-4]

In addition to the stress associated with learning to navigate food selection and preparation, college students are also confronted with additional stressors related to new academic challenges.[5] Stress, in turn, is positively associated with the intake of calorically dense, high-fat food.[6] Alcohol consumption also increases in college, which directly contributes to increases in overall caloric intake and is also associated with greater consumption of unhealthy food.[2,7]

Given all these factors, it is not surprising that the typical college student's diet is high in fat, sugar, and sodium and lacking in valuable nutrients. Indeed, the average college student consumes 1 serving of fruit, 1.5 servings of vegetables, 0.5 serving of low-fat dairy, and 1.4 servings of whole grains daily.[2,8] These values are significantly lower for some men and nonwhite students,[9] are drastically below dietary recommendations,[10] and continue to decrease over the course of students' first year of college.[7]

College students' eating habits are concerning because poor nutritional intake is associated with a number of negative health outcomes, including weight gain, or the "freshman 5," chronic diseases, and increased health care costs.[11,12] Indeed, results from a prospective longitudinal study suggest that men and women in their first year of college gain weight more rapidly than the average American at the same age.[12] Thus, these young adults' dietary habits might have significant long-term implications. As such, the transition to college represents a critical time period for dietary intervention. Nonetheless, research regarding the efficacy of interventions to promote healthy eating among college students is extremely limited. As a result, these interventions are implemented in the absence of clear empirical guidance. The aim of this research was to conduct a systematic review[13] to facilitate a narrative synthesis of the literature evaluating nutrition

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and dietary interventions in college/university settings to identify specific programs and programmatic factors associated with healthful changes in students' dietary habits. Results are intended to inform the development of more effective intervention efforts and provide directions for future research.

METHODS

Literature Search

The current systematic review was conducted based on guidelines presented by the Institute of Medicine.[13] PubMed/Medline and PsycInfo were searched for relevant studies published within the past 10 years (ie, between January 2001 and June 2011). The following key words were used: "college," "university," "nutrition," "diet," "program," "education," "intervention," "fiber," "fat," "whole grains," "fruits," "vegetables," "sugar," and "soda."

Inclusion and Exclusion Criteria

Criteria for inclusion in this review were studies that evaluated the efficacy of an intervention, program, or educational course intending to improve the dietary or nutrition habits of college/university undergraduate students. Appropriate outcomes included intake (actual or self-reported) of food and/or beverages, such as fruit, vegetables, whole grains, soda, and various nutrient groups (eg, fat, fiber, calories), as well as secondary indicators of dietary intake (eg, food selected or purchased). Studies were excluded if the intervention's primary goal was to address other outcomes, including weight or body mass index, or if the study focused on a specific subgroup of the college population (eg, medical students).

Initially, it was the intent of this study to review the results of randomized controlled trials (RCTs). However, initial searches yielded only 6 studies;[14-19] thus, the review was broadened to include quasi-experimental and nonexperimental designs. Studies selected for this review included those with human participants, written in English, and published in full-text format in peer-reviewed journals. Because of international differences in university systems, the authors limited the search to studies conducted in the United States.

Selection Process

Titles and abstracts from the preliminary search were retrieved and reviewed for relevancy. Full articles of relevant studies were retrieved for further review. Two authors assessed the retrieved studies for inclusion based on the criteria listed above. Inconsistencies were resolved between authors. A table summarizing included studies was composed (Table), describing: design, description of approach, theoretical approach, number of participants, duration, follow-up evaluations, dietary/nutrition outcomes, and a summary of key findings.

RESULTS

In total, 936 abstracts were identified through the initial search. Upon review, 34 papers were retrieved for further examination, of which 14 met inclusion criteria.[14-27] Six of the included studies were RCTs, 1 was quasi-experimental, and 7 were nonexperimental. The most frequent reasons articles were excluded were that they did not include undergraduate college/university students; did not report results of an intervention, program, or educational course; and/or were conducted outside of the United States. The Figure outlines the search process.

Overview of Studies

Interventions were conducted using 1 of 3 approaches: in-person (n = 6),[15,18,20-22,24] online (n = 5),[14,16,17,19,23] or environmental/point-of-purchase (POP) messages (n = 3).[25-27] Because of the diversity of theoretical approaches, measured outcomes, study design, and intervention duration (Table), a meta-analysis was not possible. Therefore, a qualitative assessment of the current evidence stratified by intervention approach is presented.

Intervention Approach

In-person interventions. Ha et al examined the impact of a nutrition education class on dietary intake.[20-22] Classes met 3 times per week for 50 minutes and included personalized and interactive activities based on participants' food logs, in addition to tasting activities, general nutrition information, and goal setting. Three-day food logs revealed positive dietary changes, including increases in fruit, vegetable, whole grain, and skim milk consumption; decreases in soda consumption; and increases in nutritional knowledge (Table). However, without a control group, it is impossible to determine whether these changes were a result of the intervention or the result of social desirability bias or other confounding variables.

Another limitation of this study is the inability to determine which intervention components were effective in promoting dietary change. Another study addressed this limitation by using a dismantling approach (ie, various intervention components were evaluated independently) to determine their effectiveness in promoting fiber intake among students enrolled in a nutrition course.[18] Students were assigned to 1 of 4 four-week groups: (1) goal setting only; (2) self-monitoring only; (3) goal setting and self-monitoring combined; or (4) no self-regulation components. Students in a separate health class served as the control group. Findings suggested that participants who were taught both self-monitoring and goal setting, compared with those taught 1 or fewer self-regulation skills, reported the greatest increases in dietary fiber intake.[18]

Hekler et al indirectly targeted students' eating habits via a food production and social issues course.[24] Rather than focusing specifically on diet, this course reviewed social, environmental, and policy topics associated with food. The dietary intake of students enrolled in this course was compared with that of students enrolled in health-focused courses at the beginning and the end of the semester. At posttesting, students in the social issues course reported increased vegetable consumption and decreased intake of high-fat dairy. In contrast, students in the health courses reported reductions in their vegetable intake; no additional within-group dietary changes were noted. However, because students were not randomly assigned to these classes, pre-group differences may have influenced outcomes.

Table. Studies of Interventions Targeting Dietary Habits of College Students

Reference	Design	Theory	No. of Participants	Duration of Intervention	Follow-up	Dietary Outcomes	Summary of Findings
In-Person Approach							
Werch et al 2008[15]	RCT	Behavior Image Model	299	1 visit	3 mo post	Items assessing intake of FV, carbohydrates, and fat for previous 30 d	No intervention effects for dietary intake.
Ha et al 2011[21]	Nonexperimental	SCT	80	15 wk (1 semester)	Post	3-day food log	Increased whole-grain intake (by ≈0.8 oz/d). Knowledge and intake of whole grains increased.
Hekler et al 2010[24]	Quasi-experimental	Process Motivation	100	3 mo	Post	FFQ; rating of healthy eating	Increased vegetable (by ≈4 servings/wk) and reduced high-fat dairy intake (by ≈2 servings/wk). Control group reported no dietary improvements.
Ha et al 2009[22]	Nonexperimental	SCT	80	15 wk (1 semester)	Post	3-day food log	Reduced soft drink intake (by ≈2.6 oz/d) and increased fat-free milk intake (by ≈4 oz/d).
Ha et al 2009[20]	Nonexperimental	SCT	80	15 wk (1 semester)	Post	3-day food log	Increased FV intake (by ≈0.4 and ≈0.7 servings/d, respectively), particularly for women; reduced french fry intake (by ≈0.07 servings/d). No changes in canned fruit or juice.
Schnoll and Zimmerman 2001[18]	RCT	SCT	113	4 wk	Post	3-day food log, knowledge and self-efficacy	Goal setting and self-monitoring associated with increases in dietary fiber intake (by ≈9 g/d). All interventions led to increased knowledge.

Online Approach

Clifford et al 2009[16]	RCT	SCT	101	4 wk	Post; 4 mo FU	FFQ; knowledge, attitudes, and behaviors	Intervention increased knowledge, motivation and self-efficacy for cooking; reduced cooking barriers. Changes were not maintained at FU. No changes in cooking behaviors; FV intake; or motivation, barriers, or self-efficacy for FV intake.
Morris and Merrill, 2004[23]	Nonexperimental	NA	578	1-7 d	1 wk Post	Items assessing perceptions of the program's impact on eating habits	A small percentage reported the program led them to limit fat (2.5%), try to (10.7%), or think about it (19.3%).
Franko et al 2008[17]	RCT	SCT, Transtheoretical Model	476	2-3 wk (varied by intervention)	Post, 3-mo and 6-mo FU	FFQ, FV item, SC, knowledge, barriers/benefits, social support, encouragement, and self-efficacy	Intervention increased social support for, self-efficacy for, and intake of FV (by ≈0.33 and ≈.24 servings/d); changes not maintained at FU.
Poddar et al 2010[19]	RCT	SCT	294	5 wk	Post	7-d food log, outcome expectations, self-efficacy, self-regulation, and social support	Intervention led to increases in self-regulation of and self-efficacy for intake of dairy food items (but not low fat). No changes in outcome expectations, social support, or intake.
Richards et al 2006[14]	RCT	Transtheoretical Model	314	4 mo	Post	FFQ, SC, pros and cons, and self-efficacy	Intervention led to increased FV intake (by ≈1 serving/d) and self-efficacy; pros and cons did not differ between groups or change over time. FV intake was not associated with motivational interviewing, goals, or e-mail responsiveness.

(*Continued*)

Table. (*Continued*)

Reference	Design	Theory	No. of Participants	Duration of Intervention	Follow-up	Dietary Outcomes	Summary of Findings
Environmental/Point-of-Purchase Approach							
Buscher et al 2001[25]	Nonexperimental	NA	Study 1: NA; Study 2: 72	Study 1: 28 d; Study 2: 15 d	Study 1: 13 d post; Study 2: 14 d post	Study 1: Daily food sales; Study 2: Intercept survey	Study 1: Yogurt, pretzel, whole fruit, packaged salads, and candy sales increased; FV basket sales did not. Study 2: Yogurt sales increased. More men read POPs; more women bought food because of POPs.
Peterson et al 2010[26]	Nonexperimental	NA	104	3 wk	Post	FFQ	Increased cottage cheese and low-fat salad dressing intake (no specific quantity provided); increased perceptions of availability of healthy food, which was associated with healthier eating habits.
Freedman et al 2010[27]	Nonexperimental	NA	NA	5 wk	NA	Food sales	No significant changes in the sales of any targeted food item. Overall sales of cereal, soup, and crackers increased significantly. Bread sales decreased.

FFQ indicates food frequency questionnaire; FU, follow-up; FV, fruits and vegetables; NA, not available; POP, point-of-purchase; RCT, randomized controlled trial; SC, stages of change; SCT, Social Cognitive Theory.

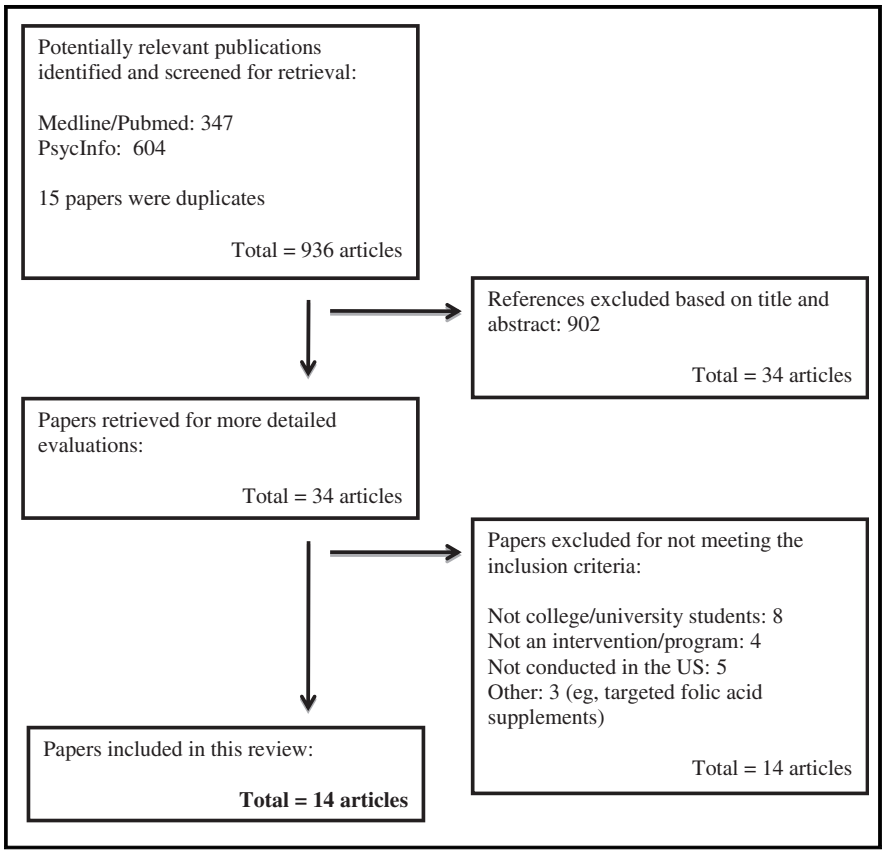

Figure. Flow chart of the search process.

Finally, in another study, data from a brief health behavior questionnaire were used to develop a single, tailored consultation session for each participating student.[15] Students in this intervention first completed a brief screening questionnaire to assess their current health behavior status; items evaluated students' eating, exercise, and sleep habits, among others. Then participants met with a fitness specialist for 25 minutes to discuss their health behaviors and how they related to the students' self-image. Finally, students were given a 1-page, personalized, behavior-based goal plan and asked to select specific goals from a list of suggestions, including those related to diet/nutrition. Students in the control group reviewed a general fitness pamphlet. At 3 months postintervention, no between-group differences in nutrition habits were found. The authors attributed these null results to the use of "high-quality commercial health education materials" in the control group, which included details regarding goal setting and self-monitoring.

Online interventions. Poddar et al examined the efficacy of a Web-based nutrition education program on students' dairy intake.[19] Material for this intervention was delivered online, once per week, and components included access to a nutritional Web site, brief educational e-mails, behavioral checklists to promote self-regulation, and personalized e-mails to enhance participants' self-efficacy to consume dairy products. Students enrolled in a health class were randomly assigned to the intervention or an assessment-only control group. Although changes were noted in the intervention group's self-regulation and self-efficacy, there were no between-group differences in dairy intake.

Franko et al conducted a similar study targeting fruit, vegetable, and fat intake.[17] Participants were assigned to 1 of 3 2-session, online interventions: (1) intervention; (2) intervention plus a booster session; or (3) an anatomy course (controls). The online intervention included an activity and nutrition tracker, general nutritional information, interactive activities, and suggestions for goal setting. Results indicated that students in both intervention groups initially increased their fruit and vegetable intake, although these changes were not maintained at 3- or 6-month follow-up. Interestingly, participants in both intervention groups were more likely to advance a stage in readiness to change dietary intake (based on the Transtheoretical Model[28]) compared with the control group.

In another study informed by the Transtheoretical Model,[28] Richards et al conducted a 4-month, online nutrition intervention and found that students in 1 of the first 3 stages of change (ie, precontemplation, contemplation, or preparation) were more likely to increase their fruit and vegetable intake relative to participants in the action or maintenance phase.[14] The authors concluded that this intervention (which included a motivational interviewing session, tailored e-mails and newsletter, and access to a nutrition Web site) was effective in "moving people from Preaction states of change to Action stages of change,"[14] although between-group changes may have been an artifact of a ceiling effect for those already eating recommended levels of fruits and vegetables.

A different online dietary intervention strategy was outlined by Morris and Merrill.[23] In this intervention, students completed the Dietary Analysis Plus program, a 3-day, online dietary log, and subsequently received personalized feedback, including graphs displaying their vitamin, mineral, and macronutrient intake relative to national dietary recommendations. One week later, a small percentage of students reported limiting, attempting to limit, or thinking about limiting their fat intake. However, dietary assessment beyond these 3 items was not obtained, and the study lacked a control group, which limited the ability to examine the effectiveness of this approach.

One final online study aimed to increase students' fruit and vegetable intake by teaching them cooking skills. Clifford et al randomly assigned students to watch 4 online weekly cooking shows (intervention group) or programs on sleep disorders (control group).[16] The intervention group reported increases in cooking motivation and self-efficacy and reductions in perceived barriers to cooking; however,

changes were not maintained 4 months later. Moreover, although students in the intervention group reported increases in their nutrition knowledge, no between-group changes were noted in fruit or vegetable intake.

Environmental interventions. Point-of-purchase interventions attempt to increase the sale of certain products using visually stimulating materials to capture consumers' attention. Buscher et al placed large POP messages, including vibrant cartoon characters, at a university's dining hall entrance and smaller ones directly next to several targeted food items.[25] As hypothesized, yogurt, pretzel, and whole fruit sales increased over the course of the 2-week intervention. The sales of fruit and vegetable baskets (vs individual fruits and vegetables) did not significantly change.

Similarly, Peterson et al evaluated the impact of a POP intervention on college students' intake of healthy food, as well as their perceptions of the availability of these items.[26] Materials with a colorful logo were placed at the entrance of the cafeteria and on signs directly above and beside 10 target food items. Flyers with information regarding the intervention were also distributed around the cafeteria. Promotional materials focused on taste, energy, health, and body leanness. Results indicated that students consumed more low-fat salad dressing and cottage cheese, and less fast food and soft drinks. By study completion, 22% of students were more aware of healthy options in the dining hall, and this awareness was correlated with improved eating habits.

Another POP intervention occurred in a residential complex convenience store at a large, racially diverse, urban campus.[27] Brochures and posters describing the program were placed at the front of the store. Tags with the POP logo were placed directly below targeted healthy food items, offered for the same price as less-healthy alternatives. Analyses revealed no significant changes in the sale of any single food item; however, overall sales of targeted food items increased 3.6%. A significant limitation of this study is that tagged items were often sold out. Thus, changes in sales may be underestimated.

SUMMARY OF FINDINGS

Fourteen studies were identified in which researchers examined efforts to improve college/university students' eating habits. All studies cited in this review used theory to inform the design and implementation of their interventions. Although multiple theoretical approaches were used (Table), most were informed by Social Cognitive Theory,[29] which posits that behavior change is dependent on the complex interplay of environmental (eg, food availability), personal (eg, self-efficacy), and behavioral (eg, skills) factors. Nearly all interventions exclusively targeted students' nutrition/dietary habits[14,16,18-27]; a minority included several health-related targets in addition to a focus on diet/nutrition, such as exercise[15,17] and sleep.[15] Six of these studies were RCTs (2 in-person[15,18] and 4 online[14,16,17,19]). Results from these 6 studies suggest that 3 interventions led to no significant changes in students' dietary intake,[15,16,19] and the remainder yielded improvements in eating habits postintervention.[14,17,18] Only 2 studies included long-term follow-up evaluations of dietary outcomes.[16,17] The follow-up period ranged from 3 to 6 months postintervention, and no significant changes in dietary intake were found relative to baseline in either study. Taken together, several online and in-person interventions led to immediate and statistically significant improvements in students' dietary intake. However, these changes were often minimal (eg, an increase of one-quarter serving of fruit per day) and not maintained in the months following intervention completion.[15] Moreover, because the intervention approaches varied widely, conclusions cannot be drawn regarding the most effective components. Nonetheless, Schnoll and Zimmerman,[18] as well as others examining mediators of dietary behavior changes in other domains (eg, heart disease prevention, primary prevention, weight management),[30-32] support the inclusion of education, self-regulation strategies (eg, goal setting, self-monitoring), and activities to promote self-efficacy for healthy eating to maximize dietary intake outcomes.

The remaining 8 studies followed either a nonexperimental approach without a control group[20-23,25-27] or a quasi-experimental[24] design without randomization. Results from all of these studies were quite promising. Specifically, Ha et al,[20-22] Hekler et al,[24] and Morris and Merrill[23] found that students reported significant improvements in a range of eating habits postintervention. Other studies also found that drawing attention to healthier food options in the college/university environment was associated with increased purchasing and consumption of these food items.[25-27] However, because of the nonexperimental design of these studies, it is difficult to identify the sources of dietary changes. Students may indeed have changed their eating habits as a result of participating in the intervention, although a number of confounding variables could also influence outcomes, such as changes in mood, weather, priorities, or social desirability.

In sum, significant variations in intervention duration (which ranged from 1 session to 4 months), intensity, and administration mode render it difficult to identify the optimal intervention components, dosage, or approach. Noted methodological limitations also contribute to difficulties in determining which interventions are effective in improving students' eating habits, and whether such changes will be maintained.

To maximize the efficacy of dietary interventions with college students, specific components of interventions reviewed here should be considered when creating new programs. As noted previously, 1 study suggests that to maximize dietary changes, in-person and online interventions should include both education and self-regulation components.[18] Interventions should also focus on inexpensive food options, as cost was identified as a barrier to healthful food consumption in several studies.[1,25,27] Approaches in which nutrition information is presented indirectly through a distinct yet related class topic might provide a unique opportunity to promote healthful dietary changes.[24] Similarly, relative to a semester-long course, less time-consuming interventions, such as adjuncts to preexisting courses, may be more feasible with this population, although more research is needed to determine the efficacy of brief interventions.[15,18]

Findings also indicate that online nutrition interventions might be effective with a subset of college students who are early in their readiness to change their eating habits.[14] As such, a screening instrument based on the Transtheoretical Model[28] could assess students' readiness to change their dietary behavior. Although there are not enough data to support the use of any single modality to maximize dietary intervention outcomes among college/university students (eg, classroom setting, Web sites, environmental modifications), more youth-friendly approaches, such as Internet programming, text messaging, and mobile phone applications, are promising future research directions, as they are relatively cost-effective and efficient. Moreover, college students are intimately familiar with the Internet as a source of health information.[33,34] Considering the multitude of personal, social, and environmental factors that influence students' eating habits, it is likely that the most effective interventions will include a combination of face-to-face, online, and environmental components, although additional research comparing the effectiveness of various approaches is needed.

Limitations

The most significant limitations in this area of study are the lack of RCTs, long-term follow-up analyses, and attention to potential mediators and moderators of change. Indeed, follow-up assessments conducted months after completion of the intervention were available for only 2 studies.[16,17] Consequently, although several studies provide evidence of short-term dietary changes, long-term effectiveness is unknown. Moreover, because most studies included in this review failed to report whether their sample sizes were dictated by power analysis or convenience, it is unclear whether nonsignificant findings are a result of the intervention or lack of power.

These samples were also largely composed of white women in their first year of college, which limits generalizability. In addition, outcomes were reliant on retrospective recall of dietary intake via food frequency measures or single-day food logs and were subsequently vulnerable to response bias. Standardized validated dietary assessment (eg, multiple 24-hour dietary recalls) is also needed.[35] A number of school-related factors (eg, food availability, schedule-related variations in eating habits, such as changes that occur during final examination weeks) could also reduce the internal validity of these studies, which should be considered. Intervention duration, theoretical approaches, and dietary assessment methods also varied significantly, making it difficult to draw conclusions across studies, thereby hampering efforts to disseminate effective interventions to colleges and universities.

Future research should attempt to modify interventions to be more germane to the college population. For example, to address the concern that healthy food spoils easily in dorm rooms, Strong et al suggested that interventionists provide "student shopping lists which include nutritious shelf-stable convenience items as well as to recommend produce and amounts for dorm-room storage."[2] Students have also recognized boredom[8] and stress[6] as triggers for unhealthy eating, and they have identified feeling "sluggish" as a negative consequence of consuming unhealthy food.[2] Thus, it is recommended that nutrition interventions focus on these short-term consequences, as well as techniques to decrease emotional eating (eg, teach emotion-regulation strategies) and promote mindful eating. It may also be particularly appropriate with college/university students to review the dietary qualities of alcohol. Interventions that focus strictly on disease prevention are unlikely to be effective if college students perceive little threat of disease.[1]

Moreover, some college students prioritize their social relationships above healthy eating,[2] and some men report concern about the potential social ramifications of engaging in certain health behaviors, such as reading food labels.[3] Thus, future research should incorporate techniques for increasing social support and strengthening and improving social norms for healthy eating.[4] For example, nutrition programs could intervene with preestablished social groups (eg, sports teams, sororities/fraternities, dorms or roommates) to build a link between positive personal and social qualities and engaging in healthful dietary habits.

In addition, many college students identified weight management as a major determinant of their dietary habits.[2] Interventions should capitalize on this source of motivation, if present, to promote healthy dietary habits. However, researchers and interventionists should simultaneously avoid inadvertently promoting disordered eating behaviors. For example, in addition to highlighting the importance of portion control in maintaining a healthy weight, intervention leaders could review techniques for promoting body satisfaction and discuss the dangers of severe caloric restriction. Special attention to body image issues has also been identified by college women as an important and lacking component of nutrition interventions.[36]

Some studies in this review and other relevant publications also highlight sex differences in dietary motivations, knowledge, and behaviors. For example, compared to their female peers, male students reported poorer dietary habits.[9] Moreover, attrition was higher for men in some nutrition programs.[14] In other studies, women were more likely to use nutrition labels to inform food selection,[37] whereas men expressed concern about peer perception if they read nutrition labels.[3] Gerend found similar sex differences when college students were exposed to 1 of 2 menus with identical prices; 1 had caloric information, and 1 did not.[38] When presented with caloric information, compared to men, women ordered items with fewer total calories (actual intake was not evaluated). Sex differences in responses to caloric information could reflect college women's greater desire to lose or avoid gaining weight; men, in contrast, generally report mixed aspirations to lose/gain weight.[39] Future research should evaluate the feasibility, acceptability, and efficacy of sex-specific nutrition interventions.

Research with older and more ethnically/racially diverse students is also needed, particularly because motivations for engaging in dietary changes may differ from those of their younger, white peers. For example, previous research has found that white, female college students are

more likely than their African American peers to report that a thin body is attractive and desirable to potential romantic partners.[40] These beliefs, in turn, were associated with greater dietary restriction and lower body mass. It may thus be necessary to identify alternative sources of motivation for women who are less concerned with obtaining a thin body type.

Additional research is also needed to investigate the effects of environmental approaches, such as POP messages. These messages can increase the sale of healthy food for some college students by serving as visual cues-to-action.[25] However, many students exposed to these messages do not recall them, suggesting that modifications to this approach are needed.[25] Moreover, actual food consumption is rarely assessed in the context of POP interventions. Finally, research is needed to understand if modifications in the availability of certain food (eg, increasing access to healthy food and decreasing access to less-healthy food) influence students' nutrition habits.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Colleges and universities are working to promote healthier eating habits among students through various environmental and programmatic strategies. This systematic review suggests that a number of approaches, particularly those involving self-regulation strategies, have the potential to facilitate changes in students' dietary intake. However, there is significant variability in intervention content and duration, and little is known about the long-term efficacy of these programs. Thus, at this time it is not possible to provide specific recommendations regarding the most effective and economical dietary interventions to implement in college/university settings. Nonetheless, this literature review identified several directions to inform the development of dietary interventions for future research and practice with this population, including the need for: (1) more rigorous methodologies, including RCTs, long-term follow-up analyses, attention to potential mediators, and standardized dietary assessment methods; (2) exploration of the efficacy of sex-specific interventions; (3) enhancing the applicability of dietary interventions to college students; and (4) implementation strategies for preventing disordered eating pathology.

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Meet the New *JNEB* Associate Editor

Madeleine Sigman-Grant, PhD, RD

Dr. Sigman-Grant is a Maternal & Child Health Nutrition Specialist and Professor with the University of Nevada Cooperative Extension. Her primary areas of interest include nutrition guidelines for feeding children, as well as childhood obesity prevention and community breastfeeding programs.

She is looking forward to receiving manuscripts on these topics and more!

Please help us welcome Dr. Sigman-Grant to the Journal as a new Associate Editor. You can contact her at msigman-grant@jneb.org.