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Development And Use Of Nutrition Newsletters To Educate College Residence Hall Students

Jeanne Pranger Florini

Eastern Illinois University

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DEVELOPMENT AND USE OF NUTRITION
NEWSLETTERS TO EDUCATE COLLEGE
RESIDENCE HALL STUDENTS

FLORINI

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DEVELOPMENT AND USE OF NUTRITION NEWSLETTERS

TO EDUCATE COLLEGE RESIDENCE HALL STUDENTS

(TITLE)

BY

Jeanne Pranger Florini

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

MASTER OF SCIENCE

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

1994
YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING
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Carol P. Reis
ADVISER

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DATE

Joyce Crouse
DEPARTMENT HEAD

[Signature]
Committee member

[Signature]
Committee member

ABSTRACT

Results of prior studies with residence hall students on this campus suggest that a newsletter might be a popular and effective nutrition education method for this population. For this pilot program, two newsletters were developed with the objectives of increasing (1) awareness of the relationship of dietary fat to health and (2) knowledge of the fat content of available foods. Content and format were developed based on communication theory and with input from a student advisory panel. Components included short nutrition articles, a "Nutrifact" (brief bit of information), and information on the fat content of foods available in dining services, at fast food establishments, and as snacks. Reader interaction was encouraged via techniques such as self-appraisal checklists. Newsletters were made available to students in 5 halls in "Take One" envelopes located in high traffic areas such as elevators, stairwells, and bathroom stalls. Evaluation of the impact of the newsletter on fat-related knowledge indicated that treatment postscores of students who read the newsletter were significantly higher than postscores of treatment students who did not read the newsletter, control group postscores, and treatment group prescores. Approximately 800 of each newsletter "disappeared" over a 4-week period. Of 220 students surveyed following the intervention, 41% indicated they read the newsletters, 80% felt they were useful, and 65%

indicated they would read another nutrition newsletter. Group interviews with housing staff indicated overwhelmingly that the program should be continued. These results suggest that a regular newsletter, directly available to students on residence hall floors, could be a popular nutrition education method for this population.

DEDICATION

To Scott, who always supports and encourages my efforts;
To Mom and Dad who inspired my values for education and hard
work.

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A special thank you to Dr. Carol Ries who dedicated much time, support, and expertise to make this project a rewarding learning experience. In addition I would like to thank Dr. Martha Brown and Dr. John Best for their input and expertise as members of my thesis committee.

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PREFACE

This thesis has been written in an alternative format approved by the Eastern Illinois University Graduate School and the School of Home Economics.

Part One and Part Two are written as separate manuscripts to be submitted for publication in specific professional journals. The format for each of these manuscripts is consistent with the author guidelines of that journal.

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INTRODUCTION

College students' nutrition attitudes, knowledge, beliefs, and behaviors have been the focus of many investigations to help design effective nutrition education programs (Boren, Dixon, & Reed, 1983; Georgiou & Arquitt, 1992; Herson, Skinner, Andrews, & Penfield, 1986; Hertzler & Frary, 1989; Reed, 1992). Nutrition education at this stage is important to help establish good dietary habits for a lifetime. While the emphasis in the adult population is on diet-related diseases, the focus for college-aged individuals is on wellness (Lindeman, Rosing, & Wallace, 1991). The emphasis on prevention in the college-aged population can help decrease health care costs for the future. Prevention education programs on college campuses, which involve nutrition education, have had somewhat positive effects on changing college students' behaviors (Daniel, 1988; Skinner, 1991). Examination of the effectiveness of such programs helps generate new ideas and suggests alternative education methods that can be used on college campuses.

The purposes of this study were to introduce a nutrition education program, in the form of a newsletter, to college students living in residence halls and to examine the impact and effectiveness of the program. The newsletter was targeted to students in the residence halls because these students have relatively similar food choices available to them and because

it was felt that other potentially confounding variables would be easier to control. An earlier study by Reed (1992) examined and assessed nutrition perceptions, behaviors, and eating habits of students living in residence halls on this campus. An intervention program was important at this time because the need to increase nutrition awareness and knowledge of college students had been established. Reed's results suggested that a newsletter might be an effective way to provide nutrition information for this population.

There were two sets of objectives for this project, the objectives of the educational program and the objectives of the study to evaluate the educational program. The educational program was designed to:

1. increase students' awareness of the relationship of dietary fat intake to current and future health, and
2. increase students' knowledge about the fat content of various food choices and how to "budget" fat in the diet.

The objectives for the evaluation study were to assess

1. students' awareness of relationships of dietary fat intake to current and future health,
2. students' knowledge of dietary fat
3. usefulness of the newsletter as perceived by students, and
4. usefulness of the newsletter as perceived by dining services and other housing personnel.

REVIEW OF LITERATURE

Considerable research on college students' nutrition knowledge and dietary behavior documents the need for nutrition education for the general population of college students in this country. This review is focused on research and evaluation of campus nutrition education programs and research on the nutrition knowledge and dietary behaviors of Eastern Illinois University students that served as specific background research for the development of this project. Additional relevant research is included on college students' nutrition knowledge and factors influencing behavior.

Campus nutrition education programs

Many nutrition education programs have been described in the literature. A large variety of educational programs have been implemented and evaluated on college campuses. Ries and Schoon (1986) designed and implemented an eight-week program in the cafeteria of the residence halls. The program focused on the USDA-DHHS Dietary Guidelines for good health and emphasized the relationship between diet and good health. It included specially-designed pamphlets and display cards that indicated calorie content of foods found in the cafeteria. Students in the treatment group (n=189) responded to a survey about the program; 32% felt their knowledge of nutrition increased, 60% felt they were more aware of their eating

habits, and 26% felt it helped improve eating habits. Students wanted to see the program continued (78% females, 61% males). The results suggested that students were receptive to this program and interest and awareness in nutrition were increased.

Combining fitness and nutrition is a common trend in nutrition education programs. Lindeman, Rosing, and Wallace (1991) conducted a study to assess nutrition involvement and activities in university-based fitness centers and to provide information for a training manual for nutrition coordinators. Seventy-one completed questionnaires were used to determine the status of nutrition education within fitness centers. The results from the questionnaires revealed that 31 fitness programs included nutrition services and education. Only half of these programs involved registered dietitians. The implications from this study suggest that dietitians should be involved in nutrition activities of campus fitness centers for overall improved health promotion and education.

A large-scale promotion program with newsletters, menus, and "flags" on nutrient dense foods (Daniel, 1988) conducted in on-campus dining facilities affected the intake of students. The program was planned and implemented by a nutrition committee on campus and it focused on providing nutrition "tips" to the students. The committee utilized pamphlets from various organizations and made a rack to distribute them, the newsletters were written biweekly and

mailed with the menus to students, and the "flags" on nutrient dense foods focused on nutrients often deficient in the diets of college students. A total of 1,323 students responded to a survey regarding these nutrition education efforts in a positive manner and indicated improved attitudes toward dining services. The results of this program evaluation suggest that nutrition education can influence students' perceptions of dining services. The author suggests that offering information about nutrition within the dining centers is an effective method for influencing students' choices.

Bedford and Domokos-Bays (1985) examined the use of nutrition newsletters for college students. The student dietetic association developed and distributed seven nutrition newsletters in the dining facilities. The objectives were to promote nutrition awareness and knowledge to the university community. The newsletters were made available as the students entered the dining centers. To assess effectiveness, surveys were administered to students, with 376 surveys returned. Of these students, 79% indicated they had read the newsletters; 41% indicated they read one to two issues. The newsletters found most useful were those covering topics on alcohol, weight, and fat. The distribution method was considered useful by 73% of the students, and 61% indicated they would like to see the program continued. The authors concluded that the responses suggested that students benefited from the newsletter program.

Students are demanding healthier alternatives to traditional food services meals (Guernsey, 1993). Nutrition educators can incorporate this trend into nutrition programs on campus. Kubena and Carson (1988) developed a program that involved reducing fat, sodium, and calories in the menus of a university foodservice. New menus with less fat, sodium, and calories than the previous menus were developed for one of the four dining centers on campus. These menus were displayed along with nutrient information about specific menu items. The program was evaluated by the responses of 97 questionnaires returned by students. The program provided guidance for the students; 35% indicated they routinely used the program information, with 19% using it for weight control. Many students who were aware of the program indicated lack of total compliance to the menus. Interest level in the program was high and students (74%) indicated desire to have it continue. The authors felt that this program could be used as a marketing tool to increase student participation in foodservice programs.

Another program by Kessler, Gilham, and Vickers (1992), was developed to involve peers in nutrition education of college students. Additional training was given to nutrition students, emphasizing topics of high interest for college students and training students to give seminars to their peers. The program was kept small and highly competitive for entrance. Quality control was measured through rigorous

performance evaluation in class and feedback from the individual who requested the presentation. The presenters were scored with a maximum score of 55, and a mean score of 48.5. The results of the quality measures and the responses of the peers indicate this program was useful in increasing nutrition awareness on campus, and is giving students practical experience.

In a program conducted in a university residence hall cafeteria by Larson-Brown (1994), a three-group classification system was developed. Labels were made to identify foods in the cafeteria according to nutrient density; high, medium, and low. Table tents were used to further explain the different categories. Based on the evaluation, this program was considered personally useful to the students and nutrient density knowledge improved with some foods. Students requested that the program be extended to other locations and the housing administration issued continued support.

Previous nutrition research at Eastern Illinois University

A need for nutrition education to increase nutrition knowledge of college students on this campus has been established in research. Gillins (1992) examined college students' knowledge and adherence to food group recommendations. One hundred and ninety-two students completed a 41-item questionnaire that assessed knowledge of food group components and serving sizes. The students scored relatively low on questions pertaining to servings; 37%

correct for recommended number of servings and 49% correct for serving sizes. Students were fairly knowledgeable about food group classification (75% correct), but for application questions, students scored poorly (45% correct). Males and females had similar scores.

Adherence to food group recommendations was examined, using a different group of students (142 students in an entry level nutrition course), and food diaries for data collection. One day food intakes were collected and compared to food group recommendations. Students' diaries reflected low compliance with food group recommendations with low consumption in dairy foods, fruits, and vegetables and high consumption of high-fat entrees and snack foods. Only 12.6% of the diet scores rated "excellent" or "good", while 76.7% of the students received "poor" scores. The author concluded that inadequate intakes could be attributed to lack of knowledge of appropriate food group choices, servings, and serving sizes.

Fat-related knowledge and attitudes of students on this campus were examined by Wilson (1992). Questionnaires, completed by 196 students, included a 22-item knowledge test on fat-related concepts and eight attitude statements. The results indicated that students had limited understanding of fat-related concepts, with a group mean score of 54% correct. Females scored significantly higher than males, home economics majors scored significantly higher than non-home economics majors. Many students correctly answered questions pertaining

to general concepts of fat (82%-95%), while only 29%-58% correctly answered questions pertaining to specific information about fat. Few correlations between attitudes and knowledge were found in this study, however results indicated that knowledge served as an indicator toward reducing dietary fat. Students in general responded positively toward attitude statements involving nutrition and dietary fat.

Reed (1992) examined healthful eating concepts of 29 students living in the residence halls on this campus in a qualitative study. The students felt that healthful eating concepts included 3 balanced meals, foods from the four food groups, and a low-fat diet. However, Reed also conducted a survey regarding eating patterns and the results were somewhat inconsistent with the students' responses to healthful eating concepts. Only twenty-four percent reported eating breakfast, 65% lunch, and 72% dinner. Also, snacking late in the day was frequently reported. The author concluded that the students recognized some benefits of eating healthfully, but intention to do so was in the future and not the present.

Kruto (1993) examined nutrition knowledge and interests of 69 female college athletes on this campus. A self-administered questionnaire contained 14 knowledge questions on nutrition concepts related to sports, nine nutrition-topic interest questions, and seven questions to assess preference of nutrition education methods.

The responses to the knowledge questions indicated that

these student athletes were generally knowledgeable about sports-related nutrition with a mean knowledge score of 64% correct. However, the athletes still had common misconceptions and lacked knowledge in some areas of nutrition, such as extra protein for bigger muscles, lack of knowledge of energy sources, inability to identify high-carbohydrate foods, and post-event meals. The responses to the interest questions indicated that these students were interested in several nutrition topics, including fat content of foods, weight loss, relationship of diet to performance, and calorie and nutrient content of foods served in dining services. Athletes from this group indicated a preference to gain additional nutrition information through newsletters and other printed materials, with 46% preferring a regular newsletter and 78% preferring table tents, posters in dining services and other printed materials.

Reed (1992) addressed the issue of college students' perceived barriers to eating healthfully. Focus group interviews with 29 students living in residence halls revealed some of the perceived barriers included the following: dislike taste of healthful foods, too busy to worry about eating healthfully, healthful foods are too expensive and/or too time consuming to prepare, lack of facilities or storage space, and planning schedules around service times of residence hall dining services is too difficult. The students involved in this study also did not perceive dining services'

meals to be healthful. These results suggest that college students do recognize that there are barriers to eating healthfully, but student intentions in making changes and overcoming barriers are in the future, rather than the present.

Nutrition knowledge of college students

Nutrition knowledge is one of the many factors that may affect nutrition behavior. In a study conducted by Allar and Mongeon (1982) of a junior college population, 146 students completed a self-administered questionnaire. The objectives of the study were to test the strength of the associations between nutrition knowledge, attitudes, and behavior and to examine the causal model (knowledge - attitudes - behavior - health) applied to both sexes. Results of this study indicated that women had higher nutrition knowledge than men, older individuals had better nutrition knowledge than younger individuals, older individuals tended to be more "overweight."

Researchers also concluded that the causal model did apply to both sexes.

After a basic nutrition course (Mitchell, 1990), students improved somewhat in the understanding of some concepts. Pre- and posttests were administered to students in a basic nutrition course (n=218) and responses were compared to control (n=279) and dietetic students (n=24). Basic nutrition course students indicated increased confidence in diet adequacy and decreased supplement use, with 45% of the

respondents indicating they made dietary changes because of the learning. Almost half answered incorrectly regarding the caloric content of carbohydrates, indicating that protein and fat were lower in calories than carbohydrates. The researcher indicated a need for assessing nutrition concerns and practices of students to help make nutrition education more effective.

In another study of 226 midwestern university students, results indicated that most students conveyed understanding of basic nutrition concepts such as relationship between diet and health, diet and exercise, and the components of the four food groups (Melby, Femea, & Sciacca, 1986). Thirty-five percent of the students answered incorrectly that carbohydrate was the richest calorie source, which is a commonly held misconception and 17% reported practices such as reducing foods high in complex carbohydrates for weight reduction. Misconceptions persist regardless of increased nutrition knowledge according to a study focused on 272 Canadian university students in 1984 and 274 students in 1971 (Chery, Sabry, & Woolcott, 1987). Nutrition knowledge increased in 1984 compared to 1971, however prevalence of nutrition misconceptions was similar.

College athletes have been the focus of many nutrition knowledge studies. In a study conducted by Shoaf, McClellan, and Birskovich (1986), 75 male athletes from various sports completed a three part questionnaire. In the three sections, questions were based upon information commonly taught in basic

nutrition courses, information of specific interest to athletes, sources of nutrition information, and perceived nutrition knowledge. As a group, the athletes scored less than 50% on the knowledge section of the questionnaire, yet felt they had adequate knowledge. Sources of information, according to the questionnaires, were from high school courses, parents, and popular magazines and books. Half of the athletes in this study reported actively seeking additional nutrition information, and many believed nutrition affected performance. The results of the study indicated that nutrition knowledge of athletes could be improved. The researchers recommended more nutrition education for the coaches, who in turn, could educate the athletes as part of the athletic program.

In a study of female athletes (Perron & Endres, 1985), the relationship between nutrition knowledge, attitudes, and dietary practices was examined. Thirty-one female volleyball players participated in 24-hour recalls and kept 48-hour records after the 24-hour recall. Nutrition knowledge and attitudes were measured as well. Common nutrition misperceptions were evident from this study, but the participants were fairly knowledgeable, with a mean score of 105 out of a possible 160 (66%).

Factors influencing behavior

As the literature suggests, many factors influence college students' eating habits. Based on a study of the

relationship of self-concept and eating behavior in 153 single, young women, Witte, Skinner, & Carruth (1991) suggested that several self-concept variables such as self-esteem, self-perceived appearance and personality have an impact on eating behaviors. Study results indicated that nutrient intake and self-concept were correlated. Individuals with a confident self-concept tended not to incorporate recommended behaviors in their diets. These independent or "Do your own thing" individuals had lower intakes of iron, thiamin, and energy than did others. Those who considered nutrition as important and those with a "careful" orientation had better eating patterns and behaviors than did those who did not have these orientations. One implication of this study suggests that dietitians may be directing nutrition education programs toward the individuals who already are the most concerned about nutrition and are failing to appeal to other personalities.

In a study conducted by Lieux (1992), college students' food choices were examined to determine the effect of the foodservice system on food choices. Results indicate that students' eating behaviors in foodservice systems were affected by ease of access of food, such as milk machines, quality of service, and product consistency. Portion sizes of main entrees had no impact on women's eating behaviors, however, smaller portions affected men's choices. Men would increase their selection of high-fat items when the protein

was limited with smaller portion sizes.

Ready access to fresh and nutritious foods in the residence hall food services was one explanation for the difference in eating behaviors between on-campus and off-campus students at a one midwestern university (Melby et al., 1986). On-campus students tended to choose more fresh fruits and vegetables than did off-campus students.

Lack of sufficient knowledge may be another factor as Mitchell (1990) addressed. In this study, 218 students taking a basic nutrition course completed questionnaires at the beginning and end of the course. The participants had increased nutrition knowledge levels and 45% indicated changes in dietary behavior based on learning and many responded with increased confidence in diet adequacy. The results from Allar and Mongeon (1982) indicated that good nutrition knowledge and favorable attitude toward nutrition were associated, and a favorable attitude toward nutrition and a good nutritional intake were associated. Perron and Endres (1985) concluded that the subjects with higher nutrition knowledge also had better attitudes about nutrition, however, no link was found between knowledge or attitudes and dietary intake.

Other areas of concern with college students are body image perception and attitude about weight and dieting (Collier, Stallings, Wolman, & Cullen, 1990; Welch, Nidiffer, Zager, & Lyerla, 1992). These authors suggested that both college males and females are concerned with body size.

Females tend to overestimate their body size and males have started to adopt irregular eating patterns because of concern about weight. Also, it was noted that more minority students have been seeking nutritional counseling and expressing concerns about body appearance. The results of this study suggest more nutrition education may need to be focused on positive body image and improved diet to improve long-term health.

Other factors influencing college students' eating patterns, according to the literature (Beerman, 1991; Beerman, Jennings, & Crawford, 1990; Hertzler & Grun, 1990; Sneed, 1991), include gender, age, availability of food, cost of food, and academic major. Another factor that influences college students' eating behaviors is residence during college. A study conducted by Beerman (1991) indicated that energy and nutrient intakes had a significant relationship to residence. Results of this study suggest that students living in the residence halls have better eating habits than students living off-campus. Researchers speculated that one reason for this difference may be that the family-style meal service of the Greek housing on campus may help decrease the number of meals skipped by students. Although on-campus students seem to have better eating habits, this is still a good group to target to increase nutrition knowledge and awareness information for the students to use after leaving the residence halls.

Another major factor influencing college students' eating behaviors is the media. Hertzler and Grun (1990), studied types of magazines read by college students with the purpose of identifying popular magazines read by college students, and to examine the advertisements within the magazines and the potential food and nutrition messages conveyed. The majority of magazines read by these college students were variety, fashion, and sports magazines. The fashion and variety magazines convey beauty in the form of slimness, therefore, sending a food and nutrition message. There were few food advertisements in these magazines, yet dieting articles were prevalent. Hertzler and Grun (1990) also found that there were few nutrition articles or ads featuring foods from the four food groups. In magazines read predominately by males, fitness and strength was the emphasis in ads and articles. This study suggests that hidden nutrition messages are conveyed in magazines frequently read by a college student population.

Based on the studies reviewed, both in the literature and on this campus, many factors must be considered before planning nutrition education programs. Although the research does not consistently reflect strong relationships between nutrition knowledge and eating behaviors, these factors, along with numerous other considerations, such as attitudes toward nutrition, must be components for successful nutrition education programs.

PART ONE

Using the nutrition communication model to develop
nutrition newsletters for college residence hall students

INTRODUCTION

Nutrition educators face many challenges and dilemmas in communicating important nutrition concepts (1). These include 1) difficulties in communicating complex concepts necessary for people to make intelligent nutrition decisions, 2) reduced potential effectiveness of the mass media channels that are often more realistic and cost effective than interpersonal channels, and 3) difficulties of developing effective programs for audiences with diverse interests and knowledge (1). To help overcome these difficulties and facilitate nutrition education program effectiveness, practitioners are encouraged to utilize appropriate theories in their program development and to make theory use more explicit (2). Glanz and Eriksen (3) have stated that while more theory-informed work is beginning to emerge, the need for greater familiarity with and ability to apply theory still exists among nutrition education practitioners and researchers.

This article illustrates how the nutrition communication model (1) was used to facilitate effectiveness of two nutrition newsletters developed for college residence hall students. The newsletter project was prompted by prior research on this campus (4,5) and was funded by the university

housing office.

THE NUTRITION COMMUNICATION MODEL

Gillespie (1) used various theories of communication to derive the nutrition communication model (Figure 1), which consists of receiver and communicator inputs, an intervening process, and outcomes.

RECEIVER INPUTS

The receivers are major contributors to the nutrition communication process, by bringing predispositions, attitudes, knowledge, experiences, opinions, and habits that will influence their responses to messages. Knowing the receivers or audience well (1, 6-8) is important to the design of effective messages. Suggested audience assessment methods include using focus groups, browsing bookstores, looking for new items in grocery stores, listening to what people believe, reading what the audience reads, learning from the media, and using research study results (8,9).

A review of research literature identified a need for increased nutrition knowledge among college students (4,5,10-19), including those on this campus (4,5,14,15). Prior work indicated that many of these students lacked knowledge and understanding of fat and that their fat-related dietary practices could be improved (14). A student advisory panel convened for this project verified that students were interested in learning more about fat. College students living in the residence halls was the targeted audience.

According to housing records, 75% of the residents are underclassmen. These students may eat in any of 6 dining centers that offer a traditional cafeteria style service with choice between two or three main entrees, salad bar, and a large choice of beverages. For week-day lunch, one specialty line features hamburgers, bratwurst, hot dogs, and french fries, another line features pizza, and the third line offers deli meats. Since residents are not allowed to have microwaves, hot plates, or hot pots in their rooms, the types of available snacks are somewhat limited. The campus is compact, with several nearby bars and fast food restaurants including a fast food restaurant in the university union.

NUTRITION COMMUNICATOR INPUTS

Gillespie (1) identifies four areas of communicator control which can influence the effectiveness of the communication: 1) choice of communication channel, 2) identity of the sender, 3) message content, and 4) design of the piece.

Communication channel

The two basic types of channels available for nutrition communication are interpersonal (personal interaction between members of a small group or in one-on-one situation) and mass (television, radio, direct mail, newspaper, printed pieces, or telephone). The choice of channel should be a conscious part of the decision-making process (1). Consideration of the audience is necessary to determine the most effective, yet

cost and time-efficient method. The content of the message also needs to be considered; complex messages may be more effective through certain channels. Shepherd (7) notes that time constraints for people to receive messages is another consideration in choosing communication channels.

A newsletter was chosen as the communication channel for this project. Findings from previous research on this campus (4,5) suggested that a newsletter might be a useful and popular communication method for this population; input from a student advisory panel and from housing staff confirmed these results. The living environment in the residence halls provided for easy distribution of the newsletters in several common areas (in bathroom stalls, by elevators and stairwells, and on bulletin boards). A newsletter allowed for flexibility in format and design, and both printing and distribution was relatively low cost.

Identity of the sender

The identity and perceived credibility of the sender will affect receivers' perception of the importance of a nutrition message (1,6). To enhance credibility of the newsletters, the developer (a registered dietitian) and sponsors (School of Home Economics and Office of Student Housing) were clearly indicated on each newsletter. Further credibility was established by endorsement by the resident assistants whom most students respect, admire, and view as role models (20). Resident assistants displayed the

newsletters in prominent places and many incorporated them into educational displays and bulletin boards.

Message Content

Clearly communicating complex concepts is a major challenge for nutrition educators (1,7). Consideration of the audience interests is essential; what nutrition educators think is important may not be of concern to the audience (9). Oversimplified messages may be as useless as extremely complex ones. Knowledgeable receivers may be offended that the sender did not account for their knowledge level, and might ignore or react negatively to the message. Besides the stated message, unstated messages and impressions are conveyed (8). Careful consideration of message content and potential unstated messages can result in communications that increase visibility and reputation of the sender, and that generate interest in the topic. A good communication can help create a bond between the receiver and the communicator (8). Examining popular media messages and what the target group reads (9) helps in determining message content and length.

The overall topic of both newsletters was fat. Specific content was based on results of a study that examined the fat-related knowledge, attitudes, and practices of students on this campus (14), personal experiences with students in the residence halls, and student advisory panel input. To avoid oversimplified messages, the newsletters contained a mixture of simple and more complex concepts. Application examples and

illustrations were incorporated and designed to appeal to all knowledge levels (Figure 2). To increase relevance to students' daily food choices, foods commonly served in dining services and fast food establishments were used as examples of relatively high and low fat foods.

Design

Noted aspects of the design of communication include time and place for receiving messages, repetition of the message, and whether the communication is primarily one- or two-way (1). Features important to consider for printed pieces include layout, type print, organization, titles, headlines, and writing style (8).

The two newsletters were distributed one each week for two consecutive weeks. Newsletters were made available in several common areas on the floors of the residence halls because prior experience had indicated that students usually discarded or ignored direct mailings or dining services handouts. The message on fat concepts was reinforced with repetition of important concepts in the second newsletter. The newsletter was mostly one-way communication, but allowed for two-way communication by providing the dietitian's phone number.

INTERVENING PROCESS

In Gillespie's model (1) the intervening process, influenced by both receiver and communicator inputs, is the first level of response and includes three response stages:

attention, comprehension, and interaction.

Receivers choose the messages to which they will give their attention (1). Shepherd (7) suggests that because this society is overcommunicated, receivers have little time to absorb and act upon messages. Dodd (21) encourages the use of "pizazz" to help market nutrition messages and grab the receivers' attention. The design of printed materials is very important. Interesting and descriptive titles and headlines, good format, reinforcing charts and tables, interesting writing, and good organization are all necessary components of effective printed materials (8). Crowded or empty pages, small print, and poor organization are not appealing and may confuse and frustrate the reader. Writing that is positive and informal, that includes interesting notes, such as a myth or startling fact, and that uses humor appropriately will help keep the receiver interested (7,8). Quizzes, recipes, "tips" or suggestions, "how-to" sections, lists and visuals have been found to be effective and appealing to some audiences (22). Size and length of a printed piece also are factors to consider (8).

Whether receivers understand the intended nutrition message is at least partly dependant on their background. Assessing comprehension of printed materials is difficult, but the communicator can increase likelihood of receiver understanding with components such as clear writing, appropriate format, clear message, and visual reinforcement.

Clear writing includes using simple sentences, avoiding fuzzy words, using active voice, appropriate tone, and reading level, and writing for the audience (23).

Gillespie (24) reports that incorporation of interaction between the communicator and the receivers or between the receivers and their peers can help gain attention, message acceptance and comprehension (1). For printed materials interaction may be incorporated with techniques such as "self-assessment" quizzes or checklists, activities, or question and answer columns.

The newsletters were developed with these suggestions in mind. To attract the reader and facilitate comprehension a "Nutrifact" (brief bit of information) was placed in a separate corner box, newspaper style columns and descriptive headings were used for short nutrition articles and nutrition "tips," and information on fat-content of various foods was presented in tabular form. Conversational, yet professional tone was used and information was presented in a positive manner to create friendliness and credibility. Subtle humor was incorporated by use of the character "Marianne Fatbuster." To further enhance comprehension, clear, concise writing, with appropriate reading level (as judged by the student advisory panel), was used. Interaction was incorporated through the use of checklists and self-assessment "quizzes." A newsletter segment that illustrates these features is presented in Figure 2. The substantial number of newsletters that disappeared

(800 of each newsletter, with a potential audience of approximately 1000 students) is evidence that the newsletter was effective in attracting students' attention. Of 220 students surveyed following newsletter distribution, however, only 41% indicated they had read them.

OUTCOMES

The outcomes of audience response or end results of a communication (second level response) comprise four categories: cognitive acceptance, affective acceptance, behavioral intention, and behavioral acceptance (1).

Cognitive acceptance is a belief-level acceptance that includes knowledge (1). On a test designed to assess students' knowledge of newsletter information, the students who indicated they had read the newsletter scored significantly higher ($p < .001$) than did those who indicated they had not (25).

Affective acceptance involves a positive attitude of the receiver toward the message. Based on responses to several attitude statements, students had positive attitudes towards nutrition and dietary fat both before and after reading the newsletters (25). Students' attitudes towards the newsletters also were positive. Of those students who read the newsletters, 94% felt they were useful, 87% indicated that they would read another nutrition newsletter, and 56% kept or shared the newsletters.

Behavioral intention differs from behavioral acceptance in that it reflects intention to change behavior rather than actual change (1). Since the newsletter program was short and used only one channel of communication, actually changing fat-related behaviors was not considered a realistic goal. Sixty-eight percent of the newsletter readers reported that they felt more able to reduce dietary fat as a result of the newsletter information, and seventy-four percent strongly agreed or agreed that they planned to reduce fat in their diet.

CONCLUSION

This article has described the application of Gillespie's nutrition communication model (1) to the development, implementation, and evaluation of newsletters designed to increase college students knowledge about and attitudes towards fat in their diets. Student responses to the newsletters, along with evaluation results suggest that the model was useful in facilitating newsletter effectiveness. Nutrition practitioners are encouraged to seek out and utilize appropriate theories in nutrition education program development.

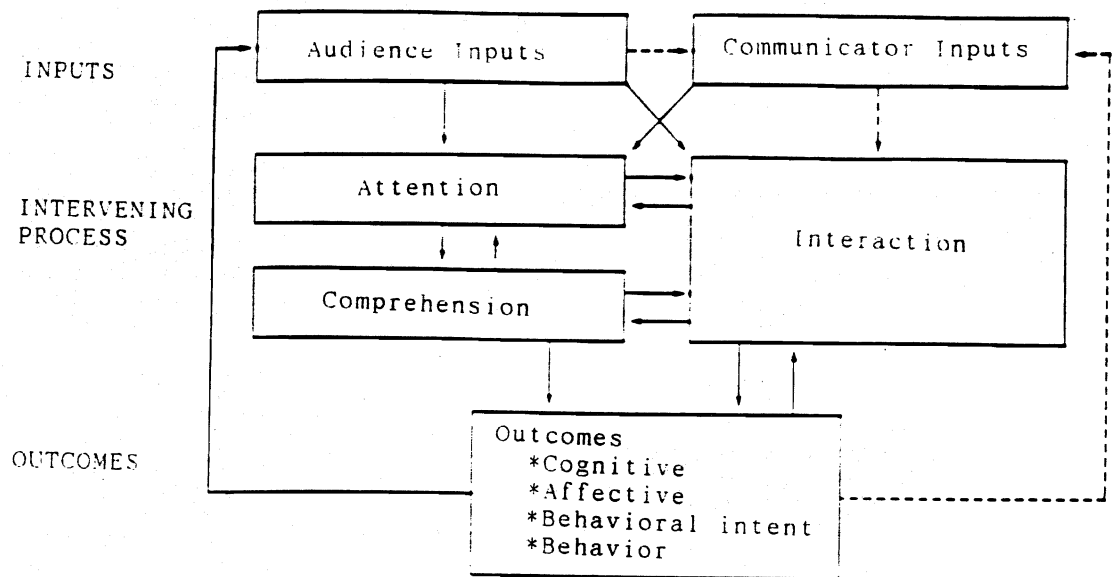


FIGURE 1. Gillespie's Nutrition Communication Model (1)

FOCUS ON FAT - THE GOOD AND THE BAD

Do we actually need fat? YES!! Face it, there is a "fat scare" going on, so it's important to know why fat is needed.

It's true that fat packs a double wallop of calories (9 calories per gram, compared to 4 calories per gram for protein and carbohydrates). This is why eating less fat to decrease calories for weight loss is a good recommendation. High fat diets are also associated with greater risk of heart disease, cancer, obesity, and several other medical problems.

BUT, some fat is necessary for good health and cannot be eliminated from the diet completely. Body fat helps protect organs, provides insulation, and provides ready energy for muscles (even the heart muscle!) Fats that you eat provide essential fatty acids, help transport fat-soluble vitamins (A, D, E, K), help make you feel full.

So for good health, avoid either extreme of fat intake (too much or too little). Remember MODERATION is the key!!

Sponsored by the Office of Student Housing and Dining Services and the School of Home Economics. For questions and comments contact Jeanne Florini, R.D. at 581-5733.

TIPS TO REDUCE FAT

Check how many of these easy tips to reduce fat in your diet you already follow:

- _____ Eat low fat dairy products such as skim and 2% milk, 1% cottage cheese
- _____ Trim all visible fat from meats
- _____ Choose baked, broiled, and braised instead of deep-fat fried foods
- _____ Minimize use of salad dressings, sauces, extra cheese, sour cream
- _____ Eat vegetables with less or without margarine or cheese
- _____ Minimize intake of high fat foods such as cake, pie, cold cuts, ice cream

If you checked:

5 - 6 - WAY TO GO, you're doing great for a healthy heart

3 - 4 - KEEP IT UP, and keep trying new ways to reduce fat

2 or fewer - KEEP TRYING, try one or two low-fat modifications at a time and be consistent!

MIX AND MATCH LOW FAT WITH HIGH FAT CHOICES

You need not eliminate your favorite high fat foods from your diet. You just need to learn how to balance them with low fat choices! See how Marianne Fatbuster did it!

BREAKFAST

Bagel (1 g) with 1 oz. cream cheese (9.5 g)
1 Cup Fruit Loops (0.5 g) with 1/2 Cup skim milk (trace)
8 oz. Orange juice (0 g)

LUNCH

Cheeseburger on bun with lettuce with catsup & special sauce (17 g)
Carrot sticks (0 g)
Fresh apple (0.5 g)
1 scoop mint chocolate chip ice cream (8 g)
1 glass Coke (0 g)

SNACK

1 oz. nacho chips (8 g) with 2 oz. cheese (4 g)
Apple juice (0 g)

DINNER

Baked cod with lemon (1 g)
Green beans (0 g)
Dinner roll (2 g)
1/2 T. margarine (4.5 g)
Pear halves (0 g)
1 glass skim milk (0.5 g)

SNACK

1/2 bag Lite microwave popcorn (4.5 g)
Diet Dr. Pepper (0 g)

TOTAL - 60 grams

Marianne's budget - 60 grams

FIGURE 2. Newsletter segment illustrating comprehension, attention, and interaction techniques.

References

1. Gillespie AH. Communication theory as a basis for nutrition education. *J Am Diet Assoc Supplement* 1987; 87: S-44-S-52.
2. Smith JL, Lopez LM. The application of theory and its relationship to program effectiveness in nutrition education research. *J Nutr Ed* 1991; 23: 59-63.
3. Glanz K, Eriksen MP. Individual and community models for dietary behavior change. *J Nutr Ed* 1993; 25: 80-86.
4. Reed ML. Perceived barriers of college students to making healthful food choices. Charleston, IL: Eastern Illinois University; 1992. Thesis.
5. Kruto, D. Nutrition knowledge, interests, and dietary practices of female college athletes. Charleston, IL: Eastern Illinois University; 1993. Thesis.
6. Shepherd SK. Creating principles of message construction: Building nutrition communications that work. *Food and Nutr News* 1991; 63: 31-33.
7. Shepherd SK. Nutrition and the consumer: Meeting the challenge of nutrition education in the 1990's. *Food and Nutr News* 1990; 62: 1-3.
8. Adler EW. *Print that works: The step-by-step guide that integrates writing design and marketing.* Palo Alto, CA: Bull Publishing Company, 1991.
9. McNutt K. Improving the cost-effectiveness of nutrition education. *Nutr Today* 1992; 27: 38-40.

10. Beerman KA. Variation in nutrient intake of college students: A comparison by students' residence. *J Am Diet Assoc* 1991; 91: 343-344.
11. Beerman KA, Jennings G, Crawford S. The effects of student residence on food choice. *J Am Coll Health* 1990; 38: 215-220.
12. Hertzler AA, Grun I. Potential nutrition messages in magazines read by college students. *Adolescence* 1990; 25: 717-724.
13. Sneed J. Many factors influence college students' eating patterns. *J Am Diet Assoc* 1991; 91: 1380.
14. Wilson MA. Dietary fat-related knowledge, attitudes, and behaviors among college students. Charleston, IL: Eastern Illinois University; 1992. Thesis.
15. Gillins EA. College students' knowledge and adherence to the food group recommendations. Charleston, IL: Eastern Illinois University; 1992. Thesis.
16. Boren AR, Dixon PN, Reed DB. Measuring nutrition attitude among university students. *J Am Diet Assoc* 1983; 82: 251-253.
17. Georgiou CC, Arquitt AB. Different food sources of fat for young women who consumed low-fat diets and those who consumed high-fat diets. *J Am Diet Assoc* 1992; 92:358-360.
18. Hernon JF, Skinner JD, Andrews FE, Penfield MP. Nutrient intakes and foods selected by college students: Comparison

- among subgroups divided by energy intake. J Am Diet Assoc 1986; 86: 217-221.
19. Hertzler AA, Frary R. Dietary status and eating out practices of college students. J Am Diet Assoc 1992; 92: 867-899.
 20. Blimling GS, Miltenberger LJ. The resident assistant: Working with college students in residence halls. Dubuque, IA: Kendall/Hunt Publishing Company, 1984.
 21. Dodd JL. President's page: The fifth P. J Am Diet Assoc 1992; 92: 616-618.
 22. Achterberg C, Bradley E. Bulletin features found most and least appealing to an extension audience. J Nutr Ed 1991; 23: 244-249.
 23. Schuster ER, McAllister DW. Writing for a changing world. Networking News 1993; 13(4): 3-4.
 24. Gillespie AH, Brun JK. Trends and challenges for nutrition education research. J Nutr Ed 1992; 24: 222-225.
 25. Florini JP. Using nutrition newsletters to educate college students in residence halls: A feasibility study. Charleston, IL: Eastern Illinois University; 1994. Thesis.

PART TWO

Using Nutrition Newsletters to Educate College Students in Residence Halls: A Feasibility Study

Introduction

Nutrition education for college students is important to help them establish good dietary habits for a lifetime. While the emphasis in the adult population is on diet-related diseases, the focus for college-aged individuals is generally on wellness (1). Prevention education programs on college campuses, which involve nutrition education, have had a somewhat positive effect on changing college students' behaviors (2,3). Research has documented a need for education to increase the nutrition knowledge of college students (3-9). Nutrition knowledge is not the only factor that affects nutrition behavior (10), but it is one of the necessary components (11).

A variety of educational programs have been implemented and evaluated on college campuses. Many were cafeteria-based programs that included a wide variety of components, such as promotional posters, pamphlets, and table tents (2), reduction of fat, sodium, and calories in menus (12), "point-of-choice" nutrition information provided with food choices (13), and newsletters and pamphlets distributed in cafeterias (14, 15). Nutrition programs have been implemented in fitness centers and other places such as health services on campus (1,16).

The purpose of this research was to determine the

feasibility and effectiveness of newsletters as a nutrition education method for college students living in the residence halls. The newsletter method was chosen based on earlier studies with students on this campus (17,18) that suggested that newsletters might be a popular and effective way to provide nutrition information to this population. To evaluate the feasibility of this method, two newsletters were developed, distributed, and evaluated. The nutrition topic chosen for these initial newsletters was fat. An earlier campus study (19) suggested that more education about fat was needed; input from a student advisory panel confirmed student interest in the topic. Specific evaluation objectives were to assess (1) students' knowledge of the relationship of dietary fat to current and future health and of the fat content of available foods (2) usefulness of the newsletter as perceived by students, and (3) usefulness of the newsletter as perceived by dining services and other housing personnel.

Methods

Newsletter distribution

The newsletters were distributed to residence hall students (one each week for two consecutive weeks) by several methods. Copies were made available in "Take One" envelopes located in high traffic areas such as bathroom stalls, near elevators and stairwells, and on bulletin boards. Additional copies were made available to the resident assistants to

replenish the supplies.

Evaluation design

A non-equivalent control group design (20) was used to evaluate newsletter usefulness and effectiveness. Approximately 4300 students live in the residence halls at this midwestern university of 10,000 students. Selection of the sample was done by a multi-step lottery method. The residence halls chosen to be part of the lottery were those with floors having similar number of residents. Specifically excluded from the lottery were Greek Court, one very small hall (less than 40 residents), and a hall where the residents do not have a common bathroom. Eight of the remaining twelve eligible halls were drawn with half of the halls randomly assigned to the control group, the other half to the treatment group. Separation of the two groups by residence halls was done to decrease the likelihood that control group students would be exposed to the newsletters. A second lottery drawing was conducted to determine which floors within the chosen halls would participate in the study. All residents on these floors were asked to participate on the assumption that individual participation would be greater if everyone on the floor was invited together. The potential sample of 1340 students represented 31% of the residence hall population.

Evaluation instruments

Three somewhat different questionnaires were developed: pretest for both groups, posttest treatment, and posttest

control. All three questionnaires included the same knowledge test, similar questions to assess nutrition interest and attitudes, and the same demographic questions to assess gender, age, year in school, major field of study, and whether or not students had taken a college course on nutrition. The posttest for the treatment group differed in that it also included questions on perceived usefulness of the newsletter and on what the student did with the newsletter.

A 30-item test was developed to assess fat-related knowledge. Items were generated based on the concepts included in the newsletters, were reviewed by nutrition faculty and graduate students, and were revised based on their suggestions. The final test consisted of seventeen questions that asked students to indicate whether specific foods commonly served by dining services or available as snacks were relatively low or high in fat and thirteen multiple-choice questions that assessed knowledge of various fat-related concepts and students' ability to apply knowledge in specific food choice situations. Content validity of the final test was established by a panel of six nutrition faculty and other dietitians who verified congruence of the test with newsletter content. The Kuder-Richardson Formula 21 reliability coefficients (21) of the test determined using the study participants' responses were 0.55 for pretest control, 0.54 for pretest treatment, 0.57 for posttest control, and 0.70 for posttest treatment, indicating moderate internal consistency.

Three items (pretest and posttest control) were developed to assess students' feelings about reading a nutrition newsletter, their feelings about reducing dietary fat, and their interest in nutrition-related topics. Participants were asked to respond to these items on a 4-point Likert scale (Strongly Agree to Strongly Disagree). In addition to these three items, the posttest treatment questionnaire included similarly constructed items to assess the students' feelings of motivation to read the newsletter, their interest in reading additional nutrition newsletters, and their perceived usefulness of the newsletters. Additional questions were included to determine whether the students read the newsletters and what they did with them. All of these items were also examined by the expert panel for clarity and relevance to the study. Both pre- and posttest questionnaires were pilot-tested with a sample of 16 residence hall students not participating in the study and minor modifications in question wording were made.

Data collection

All questionnaires were administered to students in a group setting. Student residents of participating floors were asked to attend a floor meeting; they were not aware of the purpose of the meeting. One researcher was present to distribute questionnaires, answer questions, and provide general assistance. Most students completed questionnaires in 15 minutes. The pretest questionnaires were administered to

both control and treatment groups approximately one week prior to distribution of the first newsletter. Posttest questionnaires were administered to both groups approximately one week after distribution of the second newsletter.

To assess the usefulness of the newsletters as perceived by dining services and other housing personnel, these staff members were asked to participate in one of several focus group discussions. Several discussion groups were conducted to allow the majority of the staff to give input and to divide the staff into homogeneous subgroups in an effort to facilitate open discussion.

Data analysis

Knowledge pretest and posttest scores were expressed as the number of questions answered correctly. Attitude and interest items were scored on a 4-point Likert scale; 4=strongly agree, 3=agree, 2=disagree, 1=strongly disagree. Negative statements were reversed so that in all cases a higher number represented a more positive response. All data were analyzed using the Statistical Analysis Systems (22) program. Frequency distributions and means were computed for all variables. Student's t-tests were used to compare knowledge scores and other responses between groups.

Results

Sample characteristics

A total of 916 questionnaires were completed. This

sample consisted of four groups; pretest control (294 students), pretest treatment (202 students), posttest control (203 students), and posttest treatment (217 students). Since students were not identified by name or code number, it was not possible to match pre- and posttest questionnaires within each group. For some comparisons the posttest treatment group was divided into two subgroups, respondents who indicated they had read the newsletter (B) or had not (A).

Of the 916 total questionnaires, 695 (76%) were completed by females. Most of the respondents (84% overall) were between the ages of 18 and 20 years. The sample consisted primarily of underclassmen; roughly 73% were either freshman or sophomores. Majors varied widely; only 7% were home economics majors, while a larger percent (57%) were non-science related majors or education majors with a non-science basis. Only 23% of the respondents indicated they had taken a class specifically on nutrition. There were no differences between any of the groups on these demographic characteristics.

Attitude and interest

Table 1 presents students' agreement with positively worded attitude and interest statements. The majority of the responses were positive, with 70%-72% of all respondents indicating interest in nutrition related topics, 77%-88% indicating that reducing dietary fat is important, and 72%-77% indicating interest in reading a nutrition newsletter. Group

mean responses to the three attitude statements are presented in Table 2. Responses indicate that posttest treatment students who read the newsletter were significantly more interested in reading a nutrition newsletter ($p < .001$) than were posttest control students. Posttest treatment students who did not read the newsletters were significantly less likely ($p < .001$) than any of the other groups interested in reading a nutrition newsletter. This group also was significantly ($p < .001$) less interested in nutrition-related topics than posttest treatment students who did read the newsletters. These students were also significantly ($p < .001$) less likely than posttest control, pretest control, and pretest treatment to feel that reducing dietary fat is important to them.

Perceived usefulness of the newsletters

The usefulness of the newsletters as perceived by students was assessed by means of several items included on the posttest treatment questionnaire. Responses to these items were generally positive for the whole treatment group but were even more positive for the subgroup of those who indicated they had read the newsletters (Table 3). Almost all of the latter group indicated that the newsletters were useful and that they would like to read another newsletter, and many felt more able to and planned to reduce dietary fat as a result of information in the newsletters. Treatment posttest students were also asked what they did with the newsletter and

60 (33%) returned it to the envelope, 48 (26%) threw it away, 26 (13%) shared it with someone else, and 52 (28%) kept it for future reference. The responses from only the students who read the newsletters were slightly more positive (Table 3).

The success of the program was measured by other methods as well. Of the posttest treatment group, 41% indicated that they read the newsletter. Approximately 800 of each newsletter "disappeared" over a 4-week period, with a potential audience of approximately 1000 students. Group interviews with housing staff indicated overwhelmingly that the program should be continued. Housing staff, including resident assistants and hall counselors, indicated that the residents, in general, at least noticed the newsletters. Many resident assistants commented that the students noticed the newsletters and wondered what they were. They felt the distribution method was appropriate indicating that "students would have just thrown them away if they (the newsletters) were in the mailboxes." Many resident assistants said they enjoyed having more information to include in their educational displays. The nutrition content was considered useful by this group, and several resident assistants mentioned that students did not realize a dietitian was on staff to help them. One resident assistant mentioned that her floor wanted more newsletters about fat. Other suggestions from this group included continuation of the program, at least two newsletters each semester, separate newsletters for men

and women, and more information on fitness and exercise.

The housing staff also indicated that they felt the newsletters would help the image of dining services. The director of housing noted that "providing students with more information about dining services shows them we aren't giving them the worst food possible." Some hall counselors said that the newsletters would help increase students' participation in improving dining services by "making useful suggestions and not just criticizing." The group agreed that the newsletters were useful, but that other nutrition education and "dining service awareness" programs could go along with the newsletters. One of the associate directors said that "students need to see that we provide useful services, and this newsletter helps us reach them (the students)."

Fat-related knowledge

Mean knowledge pre- and posttest scores for control and treatment groups are presented in Table 2. Possible knowledge scores ranged from 0 to 30. Actual scores ranged from 12 to 28 (40% to 93% correct) for pretest control, 9 to 27 (30% to 90% correct) for pretest treatment, 9 to 28 (30% to 93% correct) for posttest control, and 11 to 29 (37% to 97% correct) for posttest treatment groups. The mean score of the posttest treatment subgroup who read the newsletters (76% correct), was significantly higher ($p < .001$) than the scores of the posttest control (70% correct), the pretest treatment (71% correct), and the posttest treatment students who did not read

the newsletter (20.6, 69% correct). No differences were found in mean scores between any other groups.

Most students (77% to 99%) in all groups responded correctly to questions about the fat content of foods. The exception was identifying the dining services' chef salad as a relatively high fat food, only 17% to 28% of the students identified this correctly except the posttest treatment students who indicated they read the newsletters. Forty-nine percent of these students answered correctly. Only a few students (27% to 49%) in all groups correctly identified the lower fat fast foods. Students who indicated they read the newsletters scored better at 49%. Only 19% to 26% of the students in the pretest control, posttest control, and pretest treatment groups answered correctly that the current dietary recommendation of total calories from fat is no more than 30%. Thirty-four percent of the students who read the newsletter answered correctly. All groups scored low on the question of eating only relatively low fat foods to stay within a fat budget. Twenty-eight percent of the students indicating they read the newsletters answered this question correctly, while 19%-21% of the other groups answered correctly. Forty-four percent of students indicating they read the newsletter answered correctly that fast foods can be included in a diet limited in fat; 21% to 26% of the students from the other groups answered this correctly. All groups did not do well with the concept of "good" foods and "bad" foods. Only 25% to

31% of the students answered correctly.

Discussion

The responses to the attitude and interest statements suggest that these students have a positive attitude and are interested in nutrition. The finding of no differences in pretest and posttest treatment group (of those who read the newsletter) scores indicates that the newsletters did not appreciably influence these attitudes. This could be due to the short time span of the program and to the fact that attitude scores were high for many students even before distribution of the newsletters. Although the treatment group who did not read the newsletter had positive attitude scores, their significantly lower scores could explain why these students did not read the newsletters. Positive attitudes about nutrition may help students change eating behaviors (11) in conjunction with increased nutrition knowledge. The findings from this study should help further nutrition education efforts, since the students have a relatively positive attitude about nutrition.

Previous research on this campus reflected an interest in a nutrition newsletter(17,18). Results from this study indicate continued interest for the newsletter from all groups. This response reflects the response to similar programs in the literature(14,15). The responses to what the students did with the newsletter provided some insight on

whether the students noticed it. While only 89 students indicated that they actually read the newsletter, 186 answered this question. Presumably, at least at some point, these students had their hands on the newsletter; they may have not yet read it or may have taken it for someone else. This, and the 800 copies of each newsletter that disappeared, are indicators that the distribution method was effective.

The positive responses from the housing staff further document the usefulness of the newsletters. One of the primary purposes of the residence halls is to provide education. Residence halls are not hotels, and the purpose of the housing staff is to assist the growth and development of students (23). This particular staff feels that reliable nutrition education helps promote a better image of dining services and promotes a caring image of the housing office. Suggestions from the staff to do separate newsletters to better tailor to specific groups on campus is a good idea. Further research may be needed to determine special needs of the various groups, especially if a campus is large.

The higher posttest scores of treatment group students who indicated they had read the newsletters compared to pretest treatment group scores and posttest scores of those who indicated they had not read the newsletters suggests that the nutrition newsletters were somewhat effective in increasing students' knowledge of the concepts of dietary fat. The findings that pretest control and posttest control

scores and that pretest treatment and posttest treatment scores of those who did not read the newsletters did not differ indicates that the students were not getting this fat-related nutrition information from any other source. Since pre- and posttest respondents were not matched, however, the possibility that the more knowledgeable students were the ones who read the newsletters cannot be ruled out. All groups were fairly knowledgeable about some concepts on fat. The areas of low knowledge fell within concepts of "moderation", and applying fat-related knowledge. In general, the responses reflected unnecessary restriction of fat in the diet. Even among students who indicated that they read the newsletters the percentage of correct responses for questions involving concepts and applications was low. Although proportionally more of the students in this group answered these questions correctly than the other groups, this is an area in need for further education. Most students appeared knowledgeable about the relative fat content of most foods on the test, but few seemed able to apply this knowledge or to conceptualize fat-related and other nutrition concepts. This is consistent with prior studies with students on this campus (17,19). Nutrition education to increase nutrition knowledge is an important component in ultimately affecting eating behaviors (4). Since knowledge scores were relatively low even after the intervention, continued education and repetition of concepts may be necessary.

Applications

The results of this study indicate that a regular newsletter, directly available to students on residence hall floors, could be a popular and effective nutrition education method for this population. The newsletters could also be used in conjunction with other nutrition education programs in the dining centers or foodservices to help improve the chance of reaching the students.

Participation and cooperation for distribution by the housing office and staff should be encouraged because it could enhance their image. On this campus, the nutrition newsletters increased the staff and student awareness of services provided by the housing office. Since the success of the program involves the housing office and staff, they should be included with input of topics and methods of distribution within a particular building. The housing personnel who are in close proximity of the students (i.e. resident assistants) could be very helpful in providing this information.

Table 1

Agreement^a of control and treatment group students with selected attitude and interest statements.

Statement ^b	Control		Treatment	
	PRETEST n ^c Percent	POSTTEST n ^c Percent	PRETEST n ^c Percent	POSTTEST n ^c Percent
Interested in nutrition-related topics	292 70.6%	193 70%	201 70.1%	197 72.1%
Perceived importance of reducing dietary fat	290 88.2%	193 86.6%	201 88.1%	196 77.1%
Interested in reading a newsletter	288 72.5%	192 74%	198 77.8%	- Not Included

^a Combined percentage of "strongly agree" and "agree" responses to positively worded statements, "strongly disagree" and "disagree" responses to negatively worded statements.

^b Statements were expressed positively on some questionnaires, negatively on others.

^c Sample size varies since not all students responded to all items.

Table 2

Mean prescores and postscores of control and treatment students on knowledge and on attitude and interest measures.

Measure	Control Group		Treatment Group							
	Prescore	Postscore	Prescore	Postscore B ^a						
	n ^b	mean ± SD	n ^b	mean ± SD	n ^b	mean ± SD	n ^b	mean ± SD		
Interested in reading a nutrition newsletter. (Maximum score = 4)	288	2.94 ± 0.97	192	2.89 ± 0.94	198	2.89 ± 0.94	107	2.50 ± 0.98 ^c	87	3.29 ± 0.09 ^d
Interest in nutrition related topics. (Maximum score = 4)	291	2.95 ± 1.01	193	2.89 ± 1.03	201	2.92 ± 0.99	110	2.70 ± 1.05	87	3.27 ± 0.11 ^e
Perceived importance of reducing dietary fat. (Maximum score = 4)	289	3.34 ± 0.81	193	3.32 ± 0.85	200	3.39 ± 0.83	109	2.96 ± 1.00 ^f	87	3.37 ± 0.94
Knowledge (Maximum score = 30)	294	21.7 ± 2.8	203	21.1 ± 2.9	202	21.4 ± 2.8	127	20.6 ± 3.4	89	22.9 ± 3.2 ^g

^a Postscore A includes treatment students who indicate they did not read the newsletter. Postscore B includes only those who indicated they read the newsletters.

^b Sample size varies because some students did not respond to all items.

^c Significantly lower than all other group scores, p<.001

^d Significantly higher than control Postscore, p<.001

^e Significantly higher than treatment Postscore A group, p<.001

^f Significantly lower than control prescore, control postscore, and treatment prescores, p<.001

^g Significantly higher than control postscore treatment prescore, and treatment postscore A, p<.001

Table 3

Percentage of treatment group students with positive responses to the newsletter.

Item	Treatment Post (All)	Treatment Post (Read)
Newsletters were useful	80% ^a (n=191)	94% ^a (n=86)
Would like to read another newsletter	65% ^a (n=194)	87% ^a (n=87)
Do not plan to reduce fat in diet as a result of information provided in the newsletters	67% ^b (n=189)	74% ^b (n=86)
Feel more able to reduce fat as a result of information in the newsletters	62% ^a (n=187)	68% ^a (n=86)
Not motivated to read the newsletters	50% ^b (n=197)	66% ^b (n=86)
Information presented was new	50% ^a (n=189)	57% ^a (n=86)
Kept or shared the newsletter	41% (n=186)	56% (n=86)

^a Percentage who responded strongly agree or agree

^b Percentage who responded strongly disagree or disagree

References

1. Lindeman AK, Rosing LS, Wallace JP. Nutrition activities in university-based fitness programs. J Am Diet Assoc. 1991; 91:218-220.
2. Daniel EL. Development of a campus food service nutrition education program. J Coll Student Dev. 1988; 29:276-278.
3. Skinner JD. Changes in students' dietary behavior during a college nutrition course. J Nutr Educ. 1991; 23:72-75.
4. Mitchell SJ. Changes after taking a college basic nutrition course. J Am Diet Assoc. 1990; 90:955-961.
5. Shoaf LR, McClellan PD, Birskovich KA. Nutrition knowledge, interests, and information sources of male athletes. J Nutr Educ. 1986; 18:243-245.
6. Chery A, Sabry JH, Woolcott DM. Nutrition knowledge and misconceptions of university students: 1971 vs. 1984. J Nutr Educ. 1987; 19:237-240.
7. Barr SI. Nutrition knowledge of female varsity athletes and university students. J Am Diet Assoc. 1987; 87:1660-1664.
8. Novascone MA, Hertzler AA. Perception of nutrient density and information links of college students. J Am Diet Assoc. 1986; 86:94-95.
9. Tilgner SA, Schiller MR. Dietary intakes of female college athletes: The need for nutrition education. J Am Diet Assoc. 1989; 89:967-968.
10. Beerman KA, Jennings G, Crawford S. The effects of

student residence on food choices. J Am Coll Health. 1983; 82:251-253.

11. Allard R, Mongeon M. Associations between nutrition knowledge, attitude, and behaviour in a junior college population. Can J Public Health. 1982; 73:416-419.

12. Kubena KS, Carson DE. Nutrition promotion in a university foodservice: Reduced fat, sodium, and energy content of menus. J Am Diet Assoc. 1988; 88:1412-1416.

13. Larson-Brown LB. Point-of-choice nutrition education in a university residence hall cafeteria. J Nutr Educ. 1993; 25(6):350-351.

14. Bedford MR, Domokos-Bayo B. Newsletter for university students promotes nutrition services. J Am Diet Assoc. 1985; 85:1492-1493.

15. Ries CP, Schoon DK. Evaluation of a cafeteria-based education program for college students. J Nutr Educ. 1986; 18:107-110.

16. Kessler LA, Gilban B, Virkers J. Peer involvement in the nutrition education of college students. J Am Diet Assoc. 1992; 92:989-991.

17. Reed ML. Perceived barriers of college students to making healthful food choices. Charleston, IL: Eastern Illinois University; 1992. Thesis.

18. Kruto D. Nutrition knowledge, interests, and dietary practices of female college athletes. Charleston, IL: Eastern Illinois University; 1993. Thesis.

19. Wilson MA. Dietary fat-related knowledge, attitudes, and behaviors among college students. Charleston, IL: Eastern Illinois University; 1992. Thesis.
20. The American Dietetic Association. Research: Successful Approaches. Mexico: American Dietetic Association; 1992.
21. Gronlund NP. Measurement and Evaluations in Teaching. 3rd ed. New York, NY: Macmillan Publishing; 1976.
22. Statistical Analysis System. Cary, NC:SAS Institute; 1989.
23. Blimling GS, Miltenberger LJ. The Resident Assistant: Working with College Students in Residence Halls. Dubuque, IA: Kendall/Hunt Publishing Company; 1984:25-26.

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Effective nutrition education programs are difficult to develop due to the many challenges educators face (Gillespie, 1987). Nutrition concepts are complex and difficult to convey, audiences vary in knowledge and interests, and mass media channels are less effective than interpersonal channels (Gillespie, 1987). Special challenges exist when trying to communicate nutrition concepts to audiences; people have preconceived attitudes, beliefs, and behaviors that are central to their lifestyles (Gillespie, 1987). Therefore, it is essential to carefully develop, administer, and evaluate nutrition communications.

This study examined the effectiveness and perceived usefulness of a nutrition newsletter for college residence hall students. Gillespie's (1987) nutrition communication model was used to develop, implement, and evaluate two nutrition newsletters. The model consists of receiver and communicator inputs, an intervening process, and outcomes. Components of the newsletters included short nutrition articles, a "Nutrifact" (brief bit of information), and information on the fat content of foods available in dining services, at fast food establishments, and as snacks. Reader interaction was encouraged via techniques such as self-appraisal checklists. Newsletters were made available to students in 5 halls in "Take One" envelopes located in high traffic areas such as elevators, stairwells, and bathroom

stalls.

Pre- and posttest data were collected from the students and analyzed to assess newsletter effectiveness and usefulness. Knowledge scores, interest in nutrition-related topics and reading a newsletter, and importance of reducing dietary fat were analyzed among the control and treatment groups. Data were collected from the treatment posttest group only to assess perceived usefulness of the newsletters and behavioral intent based on the information presented.

Results suggest that the newsletters were somewhat effective in increasing students' knowledge of dietary fat concepts, those who indicated they read the newsletters scored significantly higher than pretest and posttest treatment of those who did not read the newsletters. Responses to the attitude and interest statements were positive for all groups which suggests that these students have a positive attitude and are interested in nutrition. These results suggest that newsletters did not appreciably influence these attitudes. No comparisons were made as to whether those who were more knowledgeable had more positive attitudes about nutrition.

Positive responses from the housing staff, including hall counselors and resident assistants further documented newsletter effectiveness and usefulness. The staff indicated they felt the students were aware of the newsletters, nutrition content was useful, nutrition education enhanced the housing office's image, and the distribution method was

successful.

Evaluation results, along with student and staff responses to the newsletters, suggest that Gillespie's nutrition communication model (1987) was useful in facilitating newsletter effectiveness. The results also suggest that a regular newsletter, directly available to students on residence hall floors could be effective and useful for this population.

Based on some limitations of this study, further research is suggested on the development and evaluation of nutrition education programs. Matching responses of pre- and posttest students to analyze gain of knowledge and including additional questions to examine why students did not read the newsletter would provide relevant additional information. Further research is needed to determine effective nutrition education tools to be used in conjunction with the newsletter in college residence halls and dining services.

REFERENCES

- Achterberg, C., & Bradley, E. (1991). Bulletin features found most and least appealing to an extension audience. Journal of Nutrition Education, 23, 244-249.
- Adler, E.W. (1991) Print that works: The step-by-step guide that integrates writing design and marketing. Palo Alto, CA: Bull.
- Allard, R., & Mongeon, M. (1982). Associations between nutrition knowledge, attitude, and behaviour in a junior college population. Canadian Journal of Public Health, 73, 416-419.
- American Dietetic Association. (1992). Research: Successful approaches. Mexico: Author.
- Barr, S.I. (1987). Nutrition knowledge of female varsity athletes and university students. Journal of the American Dietetic Association, 87, 1660-1664.
- Bedford, M.R., & Domokos-Bayo, B. (1985). Newsletter for university students promotes nutrition services. Journal of the American Dietetic Association, 85, 1492-1493.
- Beerman, K.A. (1991). Variation in nutrient intake of college students: A comparison by students' residence. Journal of the American Dietetic Association, 91, 343-344.
- Beerman, K.A. Jennings, G., & Crawford, S. (1990). The effects of student residence on food choice. Journal of American College Health, 38, 215-220.
- Blimling, G.S., & Miltenberger, L.J. (1984). The resident assistant: Working with college students in residence halls. Dubuque, IA: Kendall/ Hunt.
- Boren, A.R. Dixon, P.N. & Reed, D.B. (1983). Measuring nutrition attitude among university students. Journal of the American Dietetic Association, 82, 251-253.
- Chery, A., Sabry, J.H., & Woolcott, D.M. (1987). Nutrition knowledge and misconceptions of university students: 1971 vs. 1984. Journal of Nutrition Education, 19, 237-240.
- Collier, S.N., Stallings, S.F., Wolman, P.G., & Cullen, R.W. (1990). Assessment of attitudes about weight and dieting among college-aged individuals. Journal of the American Dietetic Association, 90, 276-278.

- Daniel, E.L. (1988). Development of a campus food service nutrition education program. Journal of College Student Development, 29, 276-278.
- Dodd, J.L. (1992). President's page: The fifth p. Journal of the American Dietetic Association, 92, 616-618.
- Georgiou, C.C. & Arquitt, A.B. (1992). Different food sources of fat for young women who consumed low-fat diets and those who consumed high-fat diets. Journal of the American Dietetic Association, 92, 358-360.
- Gillespie, A.H. (1987). Communication theory as a basis for nutrition education. Journal of the American Dietetic Association, 87(Suppl.), S44-S52.
- Gillespie, A.H., & Brun, J.K. (1992). Trends and challenges for nutrition education research. Journal of Nutrition Education, 24, 222-225.
- Gillins, E.A. (1992). College students' knowledge and adherence to the food group recommendations. Unpublished master's thesis, Eastern Illinois University, Charleston.
- Glanz, K., & Erikson, M.P. (1993). Individual and community models for dietary behavior change. Journal of Nutrition Education, 25, 80-86.
- Gronlund, N.P. (1976). Measurement and evaluations in teaching (3rd ed.). New York: Macmillan.
- Guernsey, L. (1993). Many colleges clear their tables of steak, substitute fruit and pasta. The Chronicle of Higher Education, March 3, A30.
- Hernon, J.F., Skinner, J.D., Andrews, F.E., & Penfield, M.P. (1986). Nutrient intakes and foods selected by college students: Comparisons among subgroups divided by energy intake. Journal of the American Dietetic Association, 86, 217-221.
- Hertzler, A.A. & Frary, R.B. (1989). Food behavior of college students. Adolescence, 24, 349-356.
- Hertzler, A.A. & Grun, I. (1990). Potential nutrition messages in magazines read by college students. Adolescence, 25, 717-724.
- Kessler, L.A., Gilham, M.B., & Vickers, J. (1992). Peer involvement in the nutrition education of college students. Journal of the American Dietetic Association, 92, 989-991.

- Kruto, D. (1993). Nutrition knowledge, interests, and dietary practices of female college athletes. Unpublished master's thesis, Eastern Illinois University, Charleston.
- Kubena, K.S., & Carson, D.E. (1988). Nutrition promotion in a university foodservice: Reduced fat, sodium, and energy content of menus. Journal of the American Dietetic Association, 88, 1412-1416.
- Larson-Brown L.B. (1993). Point-of-choice nutrition education in a university residence hall cafeteria. Journal of Nutrition Education, 25, 350-351.
- Lieux, E.M., & Manning, C.K. (1992). Evening meals selected by college students: Impact on foodservice system. Journal of the American Dietetic Association, 92, 560-566.
- Lindeman, A.K., Rosing, L.S., & Wallace, J.P. (1991). Nutrition activities in university-based fitness programs. Journal of the American Dietetic Association, 91, 218-220.
- McNutt, K. (1992). Improving the cost-effectiveness of nutrition education. Nutrition Today, 27, 38-40.
- Mitchell, S.J. (1990). Changes after taking a college basic nutrition course. Journal of the American Dietetic Association, 90. 955-961.
- Melby, C.L., Femea, P.L., & Sciacca, J.P. (1986). Reported dietary and exercise behaviors, beliefs and knowledge among university undergraduates. Nutrition Research, 6, 799-808.
- Neilson, J.L., & Larson-Brown, L.B. (1990). College students' perception of nutrition messages: How motivating are they? Journal of Nutrition Education, 22, 30-34.
- Novascone, M.A., & Hertzler A.A. (1986). Perception of nutrient density and information links of college students. Journal of the American Dietetic Association, 86, 94-95.
- Reed, M.L. (1992). Perceived barriers of college students to making healthful food choices. Unpublished master's thesis, Eastern Illinois University, Charleston.
- Ries, C.P., & Schoon, D.K. (1986). Evaluation of a cafeteria-based education program for college students. Journal of Nutrition Education, 18, 107-110.

- Schuster, E.R., & McAllister D.W. (1993). Writing for a changing world. Networking News, 13,(4), 3-4.
- Shoaf, L.R., McClellan, P.D., & Birskovich, K.A. (1986). Nutrition knowledge, interests, and information sources of male athletes. Journal of Nutrition Education, 18, 243-245.
- Shepherd, S.K. (1991). Creating principles of message construction: Building nutrition communications that work. Food and Nutrition News, 63, 31-33.
- Shepherd, S.K. (1990). Nutrition and the consumer: Meeting the challenge of nutrition education in the 1990's. Food and Nutrition News, 62, 1-3.
- Skinner, J.D. (1991). Changes in students' dietary behavior during a college nutrition course. Journal of Nutrition Education, 23, 72-75.
- Smith, J.L., & Lopez, L.M. (1991). The application theory and its relationship to program effectiveness in nutrition education research. Journal of Nutrition Education, 23, 59-63.
- Sneed, J. (1991). Many factors influence college students' eating patterns. Journal of the American Dietetic Association, 91, 1380.
- Statistical Analysis System. (1989). Cary, NC: SAS Institute.
- Tilgner, S.A., & Schiller M.R. (1989). Dietary intakes of female college athletes: The need for nutrition education. Journal of the American Dietetic Association, 89, 967-968.
- Welch, T., Nidiffer, M., Zager, K., & Lyerla, R. (1992). Attributes and perceived body image of students seeking nutrition counseling at a university wellness program. Journal of the American Dietetic Association, 92, 609-611.
- Wilson, M.A. (1992). Dietary fat-related knowledge, attitudes, and behaviors among college students. Unpublished master's thesis, Eastern Illinois University, Charleston.
- Witte, D.J., Skinner, J.D., & Carruth, B.R. (1991). Relationship of self-concept to nutrient intake and eating patterns in young women. Journal of the American Dietetic Association, 91, 1068-1073.

APPENDIX A

NUTRITION SURVEY - PRETEST CONTROL, TREATMENT

Please give us some information about yourself.

1. Are you
 - a. female
 - b. male

2. What is your age?
 - a. 17 f. 22
 - b. 18 g. 23
 - c. 19 h. 24
 - d. 20 i. 25+
 - e. 21

3. What year are you in college?
 - a. Freshman d. Senior
 - b. Sophomore e. Graduate
 - c. Junior

4. What is your major area of study?
 - a. Home Economics - Dietetics
 - b. Home Economics - Food and Business
 - c. Home Economics - Other
 - d. Science Related - For example: Biology, Zoology, Chemistry
 - e. Non-Science Related - For example: Business, Psychology
 - f. Education - Science concentration
 - g. Education - Non-Science concentration
 - h. Physical Education - Health
 - i. Undeclared

5. Have you ever taken a college course specifically on nutrition?
 - a. yes b. no

For each of the following foods found in dining services indicate whether it is (A) Relatively low in fat or (B) Relatively high in fat.

A. Relatively low fat B. Relatively high fat

6. Baked fish
7. Cheeseburger on bun
8. Chef salad
9. Grilled chicken breast
10. Fruit plate with boston bread
11. Macaroni and cheese
12. Steamed corn
13. Tuna

For each of the following snacks indicate whether it is (A) Relatively low in fat or (B) Relatively high in fat.

A. Relatively low fat B. Relatively high fat

14. Bagel
15. Candy bar
16. Canned pears
17. Chocolate chip cookies (2)
18. Fresh apple
19. Nacho chips with cheese
20. Potato chips (2 oz)
21. Pretzels (1 oz)
22. Saltine crackers (4)

23. Which of these fast food choices do you think is lowest in fat?
 - a. Chef salad with entire packet of regular dressing
 - b. Chicken fillet
 - c. Filet - O - Fish
 - d. McLean Deluxe

24. Which type of fat is most significant in contributing to heart disease?
 - a. Cholesterol in egg yolk
 - b. Hydrogenated fat in stick margarine
 - c. Saturated fat in meat
 - d. Unsaturated fat in corn oil

25. The current dietary recommendation of total calories from fat is no more than . . .
 - a. 15 grams
 - b. 15%
 - c. 30 grams
 - d. 30%

26. Which of these fast food menu decisions would NOT substantially increase the fat content of the meal?

- a. Adding extra cheese
- b. Choosing a croissant sandwich
- c. Ordering the "mega-size" fries
- d. Sharing an order of fries

Please respond whether you agree or disagree with the following statements:

- A. Agree B. Disagree

27. Some fat is needed in the diet.

28. You can reduce fat in your diet by baking instead of frying many foods.

29. To stay within your fat budget, you should only eat relatively low fat foods.

30. If you want to limit fat in your diet fast foods should not be included.

31. High fat diets for athletes help enhance performance.

32. Fruits and vegetables are "good" foods and chocolate cake and potato chips are "bad" foods.

33. A high fat diet can increase risk of heart disease, cancer, and obesity.

34. There is no difference between dietary cholesterol and saturated fat.

35. Help Marianne Fatbuster! Marianne ate the following meals and now she needs help in choosing her dinner:

Breakfast

Fruit Loops with 1/2 C. skim milk
Toast with margarine
Orange juice

Snack

Carrot sticks
Diet Coke

Lunch

Quarter Pounder
Small fries
Iced tea

Which dinner would be the best to help keep her within her fat budget of 60 grams?

a. Grilled pork chop, lettuce salad with non-fat dressing, steamed peas, low fat frozen yogurt, iced tea.

b. It doesn't matter what she eats, or whether she eats, she already blew her budget for the day by eating at McDonalds.

c. Lettuce salad with non-fat dressing, low calorie jello, fruit, and a diet Coke.

(A) Strongly Agree (B) Agree (C) Disagree (D) Strongly Disagree

TO WHAT EXTENT . . .

36. I am not interested in nutrition-related topics

A B C D

37. Reducing dietary fat in my diet is important

A B C D

38. I am interested in reading a nutrition newsletter

A B C D

APPENDIX B

NUTRITION SURVEY - POSTTEST CONTROL

Please give us some information about yourself.

1. Are you
 - a. female
 - b. male

2. What is your age?
 - a. 17 f. 22
 - b. 18 g. 23
 - c. 19 h. 24
 - d. 20 i. 25+
 - e. 21

3. What year are you in college?
 - a. Freshman d. Senior
 - b. Sophomore e. Graduate
 - c. Junior

4. What is your major area of study?
 - a. Home Economics - Dietetics
 - b. Home Economics - Food and Business
 - c. Home Economics - Other
 - d. Science Related - For example: Biology, Zoology, Chemistry
 - e. Non-Science Related - For example: Business, Psychology
 - f. Education - Science concentration
 - g. Education - Non-Science concentration
 - h. Physical Education - Health
 - i. Undeclared

5. Have you ever taken a college course specifically on nutrition?
 - a. yes b. no

Please respond whether you agree or disagree with the following statements:

A. Agree B. Disagree

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7. You can reduce fat in your diet by baking instead of frying many foods.

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12. A high fat diet can increase risk of heart disease, cancer, and obesity.

13. There is no difference between dietary cholesterol and saturated fat.

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A. Relatively low fat B. Relatively high fat

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15. Cheeseburger on bun

16. Chef salad

17. Grilled chicken breast

18. Fruit plate with boston bread

19. Macaroni and cheese

20. Steamed corn

21. Tuna

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- c. 30 grams
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- d. Sharing an order of fries

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29. Canned pears

30. Chocolate chip cookies (2)

31. Fresh apple

32. Nacho chips with cheese

33. Potato chips (2 oz)

34. Pretzels (1 oz)

35. Saltine crackers (4)

(A) Strongly Agree (B) Agree (C) Disagree (D) Strongly Disagree

TO WHAT EXTENT . . .

36. I am not interested in nutrition-related topics	A	B	C	D
37. Reducing dietary fat in my diet is important	A	B	C	D
38. I am interested in reading a nutrition newsletter	A	B	C	D

APPENDIX C

NUTRITION SURVEY - POSTTEST TREATMENT

Please give us some information about yourself.

1. Are you
 - a. female
 - b. male

2. What is your age?
 - a. 17 f. 22
 - b. 18 g. 23
 - c. 19 h. 24
 - d. 20 i. 25+
 - e. 21

3. What year are you in college?
 - a. Freshman d. Senior
 - b. Sophomore e. Graduate
 - c. Junior

4. What is your major area of study?
 - a. Home Economics - Dietetics
 - b. Home Economics - Food and Business
 - c. Home Economics - Other
 - d. Science Related - For example: Biology, Zoology, Chemistry
 - e. Non-Science Related - For example: Business, Psychology
 - f. Education - Science concentration
 - g. Education - Non-Science concentration
 - h. Physical Education - Health
 - i. Undeclared

5. Have you ever taken a college course specifically on nutrition?
 - a. yes b. no

Please respond whether you agree or disagree with the following statements:

A. Agree B. Disagree

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Small fries
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25. The current dietary recommendation of total calories from fat is no more than . . .

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27. Bagel

28. Candy bar

29. Canned pears

30. Chocolate chip cookies (2)

31. Fresh apple

32. Nacho chips with cheese

33. Potato chips (2 oz)

34. Pretzels (1 oz)

35. Saltine crackers (4)

36. I read the nutrition newsletters (Health Habit).

a. no b. yes

(A) Strongly Agree (B) Agree (C) Disagree (D) Strongly Disagree

TO WHAT EXTENT . . .

37. I think these newsletters were useful	A	B	C	D
---	---	---	---	---

38. I was not motivated to read the newsletters	A	B	C	D
---	---	---	---	---

39. I am not interested in nutrition-related topics	A	B	C	D
---	---	---	---	---

40. I would like to read another nutrition newsletter	A	B	C	D
---	---	---	---	---

41. The information presented in these newsletters was new to me	A	B	C	D
--	---	---	---	---

42. Reducing dietary fat in my diet is not important	A	B	C	D
--	---	---	---	---

43. I feel more able to reduce fat in my diet as a result of information provided in the newsletters	A	B	C	D
--	---	---	---	---

44. I do not plan to reduce fat in my diet as a result of information provided in the newsletters	A	B	C	D
---	---	---	---	---

45. What did you do with the newsletters?

- a. Returned it to the envelope
- b. Threw it away
- c. Shared it with someone else
- d. Kept it for future reference

APPENDIX D

H E A L T H H A B I T

NUTRIFACTS

Although often considered a light and healthy pastry, the croissant offers a surprise under that flaky crust. Of the 235 calories in an average croissant, over 45% come from fat. Compare this to a slice of white bread with only 13% of 70 calories from fat.

CREATING A "FAT BUDGET"

Question: About how much fat should you eat? Answer: Recommended intake is no more than 30% of your total calories. Each food need not meet this standard; you can create a fat budget for the whole day. The following chart illustrates grams of fat that represent 30% of various calorie intakes.

ESSENTIAL DAILY CALORIES	FAT BUDGET	
1400	45	*daily calories estimated for 120 lb person to maintain weight
1800*	60	
2200**	75	**daily calories for 147 lb person to maintain weight
2500	85	

It is easier to stay within your fat "budget" when you know the fat content of foods. Here's a "fat-finder" to illustrate grams of fat in one portion of some popular foods in dining services and for snacks.

Food	Grams of Fat
Baked Fish	1 gram
Tuna	1 gram
Fruit Plate with Boston Bread	3 grams
Lo-Cal French Dressing (1 Ladle)	4 grams
Biscuits and Gravy	10 grams
Lasagna with Meat Sauce	11 grams
Chicken Patty	11 grams
Spaghetti with Meat Sauce	12 grams
Cheesburger	15 grams
Hotdog with Chili Sauce	18 grams
Sausage Pizza Boat	19 grams
Macaroni and Cheese	23 grams
Regular French Dressing (1 Ladle)	24 grams
Chef Salad (Ham & Cheddar)	28 grams
Snacks	
Pretzels (1 oz.)	1 gram
Saltine Crackers (4)	1.5 grams
Kudos Bar (1)	4 grams
Chips Ahoy Chocolate Chip Cookies (2)	6 grams
Act II Lite Popcorn (1 bag)	9 grams
Potato Chips (1 oz.)	10 grams

GETTING TO KNOW THE FACTS ON FAT AND CHOLESTEROL

Do you know what kinds of fats exist?
Not all fat is the same . . .

* SATURATED FATS

This type of fat is found mainly in dairy products and meats and is usually solid at room temperature. It is also found in coconut, palm, and palm kernel oils, which are often used in making crackers, cookies, and many other products. Reducing saturated fats in the diet is important because of its link to heart disease, cancer, and other potential health problems.

* UNSATURATED FATS

This category of fat is found mostly in plants and includes both monounsaturated and polyunsaturated fats. Unsaturated fats help lower blood cholesterol when substituted for saturated fats, BUT excessive intake may promote cancer. Unsaturated fats are usually liquid at room temperature. Cooking oils containing unsaturated fats include corn, cottonseed, safflower, soybean, olive, and peanut oil. Foods containing unsaturated fat include peanuts, peanut butter, avocados, pecans, and almonds.

* HYDROGENATED FATS

These fats are made by a manufacturing process that makes unsaturated fats more saturated and therefore more solid. An example of hydrogenated fat is stick margarine.

** Did you know . . . All fats contain a mixture of saturated and unsaturated fats...

* CHOLESTEROL

Cholesterol is a fat substance made in the body and found in foods such as meat, dairy products, and eggs. It is NEVER found in plant foods. A diet high in saturated fat and cholesterol may increase your risk for heart disease.

To sum it all up . . . Eat any type of fat BUT in moderation!

LOWER-FAT SNACK CHOICES

Snacks are an important part of meal planning and are not "bad for you." An important part of snacking is choosing low fat snacks and high nutrition quality. How many of these snacks do you keep in your room?

- * carrot, celery sticks
- * unbuttered popcorn (Act II Lite Microwave)
- * Saltine crackers
- * whole-wheat bagel, with jelly or low-fat spread
- * juice or skim milk
- * fresh or canned fruit
- * animal crackers, vanilla wafers, graham crackers
- * soup and whole-grain crackers
- * cereal with skim milk
- * low-fat frozen yogurt
- * pretzels

DO ATHLETES NEED MORE FAT?

No! While fat is the most concentrated form of energy and stored fat is the primary fuel during prolonged aerobic exercise, you don't need to eat extra fat to build up your stores. Any carbohydrate and protein your body doesn't use immediately (as well as the extra fat) will be stored as fat. A high fat diet may impair performance, since the fat may take the place of carbohydrate needed for high intensity exercise, and it can make workouts more difficult. Also, since it takes a long time to digest and absorb fat, avoid fatty foods right before exercise or you may get an upset stomach.

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APPENDIX E

H E A L T H H A B I T

FAST FOOD FEASTING

What's your favorite fast food restaurant? How many meals each week do you eat fast foods? Fast food can fit into your daily fat budget - but it is important to know some fast food facts. How many facts did you know?

- * many entrees are breaded and deep fried - especially chicken and fish
- * deep-fat frying more than doubles the fat and calories of a food
- * the value meal combinations can be high in fat
- * Information on calories and fat are provided by many fast food restaurants

CHECK OUT the fat content of some popular fast foods:

McDonald's

Food	Fat Grams
Chicken Fajita	8
McLean Deluxe	10
Medium Fries	17
Filet-O-Fish	18
Quarter Pounder	20

Hardee's

Food	Fat Grams
Chicken Fillet	16
Turkey Club	22
Big Deluxe	29

Wendy's

Food	Fat Grams
Plain Baked Potato	2
Single	17
Big Classic	25
Baked Potato W/Cheese	34

Nutrifacts

Salad dressings can pack a wallop of fat. You can have a McDonald's Chicken fajita, small fries, and frozen yogurt cone for less fat (21 g) than a chef salad and a packet of ranch dressing (29 g)!

BEFORE YOU STEP UP TO THE COUNTER . . .

* THINK about what you've already eaten and what you'll eat later in the day. Fit the fast food meal into your daily food intake for the entire day. If you eat higher-fat choices (Big Mac with fries), then plan to eat a lower-fat dinner.

* Beware of special sauces, extra cheese, and salad dressings

* Watch out for commercial pastries such as croissants, pies, and cookies.

* Try some of the new lower fat versions of fast foods (McLean)

* Share the fat grams - share fries, large sandwich, baked potato with toppings, or a dessert with a friend.

The next time you stop at McDonald's in the Union - remember these tips to help you stay within your fat "budget."

MIX LOWER-FAT CHOICES WITH HIGHER FAT CHOICES

Marianne Fatbuster is at her favorite fast food restaurant. She doesn't really come here VERY often, but she wants to make sure she's within her fat budget. She knows that if she has her favorite meal - she can eat a lower fat dinner and snack. See how Wendy did it!

Breakfast

1 cup Rice Crispies cereal (trace)

1/2 cup skim milk (trace)

toast with jelly (1 g)

orange juice (0 g)

Snack

Orange (.5 g)

Lunch

Quarter Pounder W/ cheese (28 g)

Small French Fries (12 g)

Diet Coke (0 g)

Dinner

Grilled Chicken

Breast (3 g)

Lettuce salad

with vegetables,

1 oz. non-fat

dressing (2 g)

Steamed corn (1 g)

Grapes (0 g)

1 cup skim milk (.5 g)

Snack

Apple (.5 g)

Total - 49.5 grams

Marianne's Budget - 60 grams

FOCUS ON FAT - THE GOOD AND THE BAD

Do we actually need fat? YES!! Face it, there is a "fat scare" going on, so it's important to know why fat is needed.

It's true that fat packs a double wallop of calories (9 calories per gram, compared to 4 calories per gram for protein and carbohydrates). This is why eating less fat to decrease calories for weight loss is a good recommendation. High fat diets are also associated with greater risk of heart disease, cancer, obesity, and several other medical problems.

BUT, some fat is necessary for good health and cannot be eliminated from the diet completely. Body fat helps protect organs, provides insulation, and provides ready energy for muscles (even the heart muscle!) Fats that you eat provide essential fatty acids, help transport fat-soluble vitamins (A, D, E, K), help make you feel full.

So for good health, avoid either extreme of fat intake (too much or too little). Remember MODERATION is the key!!

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TIPS TO REDUCE FAT

Check how many of these easy tips to reduce fat in your diet you already follow:

- _____ Eat low fat dairy products such as skim and 2% milk, 1% cottage cheese
- _____ Trim all visible fat from meats
- _____ Choose baked, broiled, and braised instead of deep-fat fried foods
- _____ Minimize use of salad dressings, sauces, extra cheese, sour cream
- _____ Eat vegetables with less or without margarine or cheese
- _____ Minimize intake of high fat foods such as cake, pie, cold cuts, ice cream

If you checked:

5 - 6 - WAY TO GO, you're doing great for a healthy heart

3 - 4 - KEEP IT UP, and keep trying new ways to reduce fat

2 or fewer - KEEP TRYING, try one or two low-fat modifications at a time and be consistent!

MIX AND MATCH LOW FAT WITH HIGH FAT CHOICES

You need not eliminate your favorite high fat foods from your diet, you just need to learn how to balance them with low fat choices! See how Marianne Fatbuster did it!

BREAKFAST

Bagel (1 g) with 1 oz. cream cheese (9.5 g)
1 Cup Fruit Loops (0.5 g) with 1/2 Cup skim milk (trace)
8 oz. Orange juice (0 g)

LUNCH

Cheeseburger on bun with lettuce with catsup & special sauce (17 g)
Carrot sticks (0 g)
Fresh apple (0.5 g)
1 scoop mint chocolate chip ice cream (8 g)
1 glass Coke (0 g)

SNACK

1 oz. nacho chips (8 g) with 2 oz. cheese (4 g)
Apple juice (0 g)

DINNER

Baked cod with lemon (1 g)
Green beans (0 g)
Dinner roll (2 g)
1/2 T. margarine (4.5 g)
Pear halves (0 g)
1 glass skim milk (0.5 g)

SNACK

1/2 bag Lite microwave popcorn (4.5 g)
Diet Dr. Pepper (0 g)

TOTAL - 60 grams

Marianne's budget - 60 grams