A Mixed-Method Evaluation of a College Student Fitness Program Using the RE-AIM Framework

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Abstract

Background: The consistently rising obesity rate in college student population illustrates the need for organized and effective interventions. The purposes of this study were to evaluate an eight-week fitness program implemented at university student recreation center using mixed-methods along the *reach*, *effectiveness*, and *implementation* dimensions of the RE-AIM framework for evaluating health-promotion programs and to illustrate how qualitative data can be used to enhance the capabilities of the RE-AIM framework to evaluate such programs via providing recommendations to improve the intervention not possible with just a quantitative RE-AIM evaluation. **Methods**: Quantitative (participation rate, changes in % body fat, and resting heart rate) and qualitative methods (focus groups, interviews, and surveys) were used in the study. Participants in the evaluation were program users. **Results**: The program *reach* (1.5/100) and *effectiveness* (8.5/100) were low, with moderate *implementation* on the individual level (45.5/100) and high *implementation* on the organizational level (79/100). Major qualitative themes illustrated that the program's strong points were in facilitating *physique improvements* (n = 11), *increasing knowledge* (n = 10) and *motivation* (n = 7) and program shortcomings were primarily due to the quality of personal training (n = 52) and the program dietician services (n = 14). **Implications**: Such programs often suffer from diminished effectiveness when delivered in the real world, as evident in the present study. The results of the study evaluation can help in the development of effective health promotion programs for the college student population. Suggestions for practice via the RE-AIM framework in conjunction with qualitative analyses are included.

Keywords: College Students, Wellness, Weight Loss, Program Evaluation, RE-AIM

Introduction

College students are not impervious to the obesity epidemic. Analyses of the Behavioral Risk Factor Surveillance Survey System (BRFSS: CDC, 2007) indicate that the greatest increases in overweight and obesity occur in persons between the ages of 18 and 29 years of age – a time when many individuals are attending college (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). Data from the Fall 2009 American College Health Association – National College Health Assessment (ACHA-NCHA-II: ACHA, 2010) indicated that 47.3% of college students are trying to lose weight, with 48.7% reporting exercising to lose weight and 32.6% reporting dieting to lose weight in the past 30 days. In addition, 67% of obese young adults (18-24 years) in the U.S. reported trying to lose weight, yet only 24.3% received professional advice on how to go about doing so (McCracken, Jiles, & Blanck, 2007). This is reflected in the 2009 ACHA-NCHA-II, where 59.6% and 55.8% of college students reported an interest in receiving information on nutrition and physical activity, respectively, from their university. Hence, there is a demand for programs and information to assist college students in developing successful, sustainable, and healthy weight-management methods.

The Role of Colleges in Preventing and Treating Obesity

The college years can be an ideal time for implementing programs to decrease inactivity, increase nutritional and physical activity knowledge and decrease obesity. McTigue, Garrett, and Popkin (2002) demonstrated the importance of obesity interventions targeting young adults by illustrating that over 80% of the obese adults in their longitudinal study of 9179 participants became obese during early adulthood. Considering that many college students are still developing their lifestyle patterns, the college years may provide the best opportunity to provide wide-reaching, cost-effective interventions necessary for healthy lifestyle changes. In 2007, there were approximately 17.5 million students enrolled in postsecondary degree-granting institutions with 39% of all 18-24 year-olds enrolled in college (US Department of Education, 2007). With access to a large proportion of young adults, as well as resources and funding to provide services, college campuses provide an excellent medium for reaching a large number of diverse young adults with education and preventative programs for weight management and active lifestyles.

There is insufficient epidemiologic literature, however, on the determinants of weight gain for this population and even less on effective interventions (Gokee-Larose, Gorin, & Wing, 2009b; Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008), with even fewer examples of studies systematically evaluating those programs providing the interventions.

RE-AIM Framework

One way in which intervention programs could be evaluated is with the RE-AIM framework (Glasgow, Vogt, & Boles, 1999), which provides an outline to evaluate interventions. The evaluation is conducted on individual and organizational levels across five dimensions: (1) *reach*, (2) *effectiveness*, (3) *adoption*, (4) *implementation*, and (5) *maintenance*, with *reach* and *efficacy/effectiveness* comprising the individual level and *adoption* comprising the organizational level of the assessment. *Implementation* and *maintenance* can be assessed at both the individual and organizational levels as well (Estabrooks & Gyurcsik, 2003; Glasgow et al., 1999). Each of the five dimensions is assessed on a 0-100 scale. A central tenet of the RE-AIM model is that the public health impact of an intervention is the combination of its effects on all five dimensions. The data collected via the RE-AIM model can be used for several appraisals: (1) an intervention's overall public health impact; (2) comparing the intervention's effects over settings or time; (3) comparing two or more interventions across one or more of the dimensions; (4) guiding decisions pertaining to effective resource allocation (Glasgow et al., 1999); and (5) assessing the translatability of an intervention from research to practice (Estabrooks & Gyurcsik, 2003). Previous researchers (Estabrooks, Dzewltowski, Glasgow, & Klesges, 2003; Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004; Toobert et al., 2005) have demonstrated that the RE-AIM framework is sufficient to use for the evaluation of lifestyle management interventions. To date, very few studies have used focus groups and qualitative methods to enhance quantitative data gathered along the RE-AIM dimensions.

Purpose

The primary purpose of this study was to evaluate a fitness program implemented at a large mid-Atlantic university student recreation center using qualitative and quantitative methods along dimensions of the RE-AIM framework (excluding *adoption* and *maintenance*). A secondary purpose of the study was to illustrate how qualitative data can be used to enhance the capabilities of the RE-AIM framework to evaluate such programs via providing suggestions to improve the intervention not possible with just a quantitative RE-AIM evaluation.

Methods

Program Design

The Body for Break program was developed by the university student recreation center staff in 2006, and has been offered January through March in each subsequent year. The goal of the

eight week program is to help college students attending a large mid-Atlantic university to get fit for spring break by providing them with free personal training, nutritional consultations, support groups, weekly motivational/informational emails, and prizes. The targeted outcomes of this study were decreased body fat percentage and increased fitness.

Participants were able to sign-up for the program using the recreation center website. At the start of the eight-week program, targeted physiological outcomes of participants (weight, body fat, body size, resting heart rate and blood pressure) were assessed by personal trainers and "before" pictures were taken. At the conclusion of the program, a panel of judges was assembled (independent of this study) to determine the winner of the contest based on these criteria: visual inspection of "before" and "after" photos, body fat loss, inches lost, and decreased blood pressure/ heart rate. There were prizes given to both the male and female top three finishers. During every week of the program, prizes were raffled off among all participants who exercised at the student recreation center at least three times during the week of the raffle. To be eligible to win the final prize, participants had to complete the pre- and post-test physiological assessments.

Research Design and Participants

The data collection used a non-experimental design, incorporating an external evaluation of the program. Mixed methods (qualitative and quantitative) were used to cross-validate findings.

Eligibility for the Body for Break program included being a full-time undergraduate or graduate student at the university and paying the $10 enrollment fee. Eligibility for inclusion in the quantitative evaluation of the *effectiveness* dimension of the program was completing the program, denoted by completing the physiological post-assessment. Eligibility for inclusion in the quantitative evaluation of the *implementation* dimension of the program (via the online program evaluation survey) was the same as eligibility for inclusion the qualitative evaluation of the *reach*, *effectiveness* and *implementation* dimension of the program via focus groups/interviews. These criteria included enrolling in the program, completing the initial physiological assessment, and having exercised at the student recreation center for at least two of the eight weeks of the program after the initial assessment (determined by facility attendance records). Therefore, both completers of the program and those who started but did not complete the program were eligible for participation in qualitative evaluation.

Quantitative evaluation participants

Participants involved in the quantitative evaluation of the effectiveness and implementation dimensions of the program evaluation completed the Body for Break program (n = 93; referred to as "completers"), denoted by returning for the post-program physiological assessment; therefore a purposive sample was used. In addition, seven "non-completers" (n = 7) also participated in the evaluation of the *implementation* dimension for a total of 100 participants in the *implementation* dimension evaluation.

Qualitative Evaluation Participants

Qualitative data was gathered on the *reach*, *effectiveness*, and *implementation* dimensions by means of two focus groups (n = 6, n = 7) for those who completed the program (n = 93; "completers"), and six separate individual interviews (n = 6) from individuals who dropped out of the program approximately mid-way through and did not return for the post-program physiological assessment (n = 312; referred to as "non-completers"). Focus group/interview participants (total n = 19) were 76% female, 35% graduate students, and 41% between the 20-21 years of age.

Instrumentation

Instruments included: (1) a program evaluation survey administered online at the end of the program (primarily used to address the RE-AIM dimensions of *effectiveness* and *implementation*), with items pertaining to quality of services scored on a likert-type scale of 1 (*not at all satisfied)* to 5 (*very satisfied*); and (2) physiological measurements [i.e., percent body

fat and weight (pounds) (both via Tanita 310GS Body Composition Analyzer); body size (inches; measured with tape measure); resting heart rate (beats per minute) and blood pressure (mmHg; both via automatic digital arm cuff blood pressure monitor)] taken before and after the program by facility staff (used to address the *effectiveness* dimension). Facility use by those who participated in the program was assessed by analyzing student records of visits, which were kept electronically by the student recreation center. Demographic information pertaining to the student body at large was available on the University's website.

Procedures

Prior to collecting data, approval was obtained from the university Institutional Review Board (IRB) for the Protection of Human Subjects.

Quantitative Procedures

The pre- and post physiological assessments used for the assessment of the *effectiveness* dimension of the program were conducted at the student recreation center by facility staff at the beginning and end of the eight-week program. Computers were also set up at the post-assessment for program "completers" to complete the online program evaluation survey for the *implementation* dimension assessment, which was available at the end of the program to all program participants via a link on the facility website. Therefore, all "completers" (n = 93) plus seven additional "non-completers" (n = 7) who accessed the survey on their own accord completed this assessment. Quantitative data from the online program evaluation survey, enrollment data, and physiological data from the pre- and post-program assessments were obtained from program staff at the conclusion of the program. Data was delivered in Microsoft Excel and then imported into SPSS for data analysis.

Qualitative Procedures

Focus group participants were recruited in-person during the final assessment ("completers"). Additionally, during the week of the final assessments, interview participants were recruited via email from the pool of individuals who did not complete the Body for Break program ("non-completers"). A cover letter outlining participation in the qualitative component of the program evaluation was given to participants' preceding focus groups/interviews. During the focus groups/ interviews, participants discussed an evaluation of the program with topics including initial reasons for joining the program, facilitators and barriers to success, overall experiences with the program, post-program impact, and suggestions for program improvement. The qualitative scripts for both "completers" and "non-completers" were identical. Focus groups/ interviews were recorded using a both a digital audio recorder and a tape recorder and transcribed for analysis by the researcher and two trained research assistants.

Data Analysis

Quantitative Data Analysis

As modeled by Abildso, Zizzi, and Reger-Nash (2010) in an evaluation of an insurance-sponsored weight management program using the RE-AIM model, descriptive and inferential statistical procedures were used to calculate values pertaining to the research questions on the dimensions of the RE-AIM framework. Calculating these indices involves using effect sizes from multiple statistical tests and subtracting and/or multiplying these from one another and/or percentage values. As recommended by Glasgow, Klesges, Dzewaltowski, Estabrooks and Vogt (2006), values for RE-AIM indices are displayed on a scale from zero to 100. Descriptive statistics were reported for participants, including demographics and values on each of the following physiological variables: body fat, weight, body size, resting heart rate and blood pressure (see Table 1). Differences in pre-assessment and post-assessment physiological values were analyzed by paired t-test and mixed-model repeated measures 2x2 ANOVA's.

Qualitative Data Analysis

Focus group discussion topics were guided by the research questions through the RE-AIM framework and generated data in accordance

Table 1

Participant baseline characteristics and physiological data.

	All (N=405)		Women (n=336, 83%)		Men (n=69, 17%)	
Age group (n, %)						
17-19.9	138 (34%)		121 (36%)		17 (24.6%)	
20-21.9	147 (36.1%)		121 (36%)		26 (37.7%)	
22-23.9	73 (17.9%)		60 (17.9%)		13 (18.8%)	
24-25.9	15 (3.5%)		10 (3%)		4 (5.8%)	
26+	33 (8.1%)		24 (7.1%)		9 (13%)	
Class Status						
Freshman	97 (24%)		81 (24%)		16 (23.5%)	
Sophomore	73 (18%)		64 (19%)		9 (13.2%)	
Junior	70 (20%)		70 (20.8%)		11 (16.2%)	
Senior	97 (24%)		76 (22.6%)		21 (30.9%)	
Graduate/Professional	57 (14%)		46 (13.6%)		11 (16.2%)	
Measures (M+SD)	N=		N=		N=	
Age	405	21.06 ± 3.4	336	20.9 ± 3.1	69	22.0 ± 4.5
Height (inches)	405	65.8 ± 3.5	336	64.8 ± 2.8	69	70.5 ± 3.1
Weight (pounds)	405	167.7 ± 92.1	336	154.1 ± 34.5	69	233.8 ± 198.0
BMI[a] (kg/m²)	404	26.4 ± 59.1	336	25.8 ± 5.3	68	29.7 ± 7.5
RHR[b] (bpm)	400	83.9 ± 14.0	332	84.6 ± 14.0	68	80.6 ± 13.5
SBP[c] (mmHg)	403	129.5 ± 14.6	334	127.8 ± 14.1	69	137.6 ± 14.5
DPB[d] (mmHg)	403	79.4 ± 10.9	334	79.2 ± 10.4	69	80.9 ± 13.0
Body Fat %	391	28.0 ± 8.9	325	31.3 ± 8.2	66	23.2 ± 9.2
Waist (inches)	405	32.9 ± 6.2	335	31.8 ± 5.5	69	38.0 ± 7.0

Note. [a]Body Mass Index, [b]Resting Heart Rate, [c]Systolic Blood Pressure, [d]Diastolic Blood Pressure.

with that structure. Verbatim transcriptions from the recorded sessions were produced. Key themes and patterns within the data were subsequently identified and coded from a review of all transcripts thereafter. To ensure that the interpretation of the transcripts reflected the reality and ideas of the participants, two additional independent reviewers read and coded the transcripts. From this, a consensus on the coding of the data was established. After all data was coded and categorized, it was analyzed for major concepts via axial coding, or the reassembling of categorized data into larger categories (Holloway, 1997). Findings from focus groups and interviews were organized and presented in Table 1 which followed the format used by Tavares and Plotnikoff (2008) Constant comparison was used throughout the data analysis process where the data was compared with other data obtained throughout the evaluation for not only confirmation, but differences and relationships as well (Holloway, 1997). The final step of the data analysis combined the information obtained via all methods to evaluate the program and answer the research questions on the dimensions of the RE-AIM framework.

Results

Effect sizes for chi squares are denoted by Cramer's Phi (φ^2) or Cramer's V, Cohen's *d* for paired-samples t-test, and the squared curvilinear correlation coefficient (partial eta squared; η^2) for repeated measures ANOVA. Means and standard deviations are reported for all descriptive data. Standardized RE-AIM index scores can be found in Figure 1. Quantitative data is presented for each RE-AIM dimension with qualitative support to follow.

Table 2

Focus Group and Interview Results Between Program Completers and Non-completers

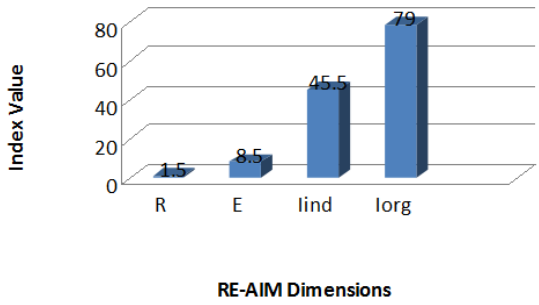
Question	Major Themes		Number of Participants Identified	Concepts / Comments
1. Initial attractions to program	Physical		C = 3 NC = 4	To get in shape; to lose weight; to tone up
	To use personal training services		C = 3 NC = 2	To increase knowledge on exercise; get an exercise plan
	To use nutrition services		C = 2 NC = 0	To increase knowledge on nutrition; to get a diet plan
	Contest/ Competition		C = 5 NC = 0	Contest/ competition appeals to personality (e.g., "I'm a competitive person so this was attractive")
	Extra motivation		C = 5 NC = 0	Seeing results of others; increased accountability (e.g., a "reason to go")
2. Initial turnoffs	Negative experience w/ personal training		C = 5 NC = 2	Hard to schedule; inconsistent; general "negative experience" with personal training component
	Programmatic		C = 2 NC = 1	Misconception of program; program not distinct
3. Barriers to success	Time Constraints		C = 11 NC = 6	Time constraints due to academic tasks and work tasks
	Diet		C = 9 NC = 2	Maintaining "willpower"; expense of buying "healthy" foods
	Decreased motivation		C = 5 NC = 2	Not seeing results; boredom
	Lack or negative social support		C = 3 NC = 2	Needing a "workout buddy"; adverse temptations from peers
	Rec center problems		C = 3 NC = 1	Crowds; hours of operation; parking
4. Contributors to success	Cognitive		C = 1 NC = 2	Previous exercise history/knowledge; getting expectations in line with reality
	Getting advice from staff		C = 3 NC = 0	Talking with trainers; getting tips/advice
5. Effectiveness	**Positive**	Physique improvements	C = 8 NC = 3	Weight loss, inches decreased, increased muscle tone/ strength
		Increased knowledge	C = 6 NC = 4	Increased general knowledge/ information; learned different exercise routines; learned how to use equipment
		Increased motivation	C = 7 NC = 0	Increased desire to exercise/ adhere to associated health behavior changes
	Negative	Lack of effectiveness	C = 7 NC = 1	Not getting results; not getting what participant needed; gaining weight
6. Component implementation	**Personal training**	Did not use	C = 6 NC = 1	
		Used consistently	C = 7 NC = 0	
		Used only once	C = 1 NC = 3	
	Dietician	Did not use	C = 5 NC = 5	
		Used own diet plan	C = 1 NC = 3	Used a diet plan during the program but did not get from B4B dietician
	Emails	Read fully	C = 4 NC = 2	
		Read through "a few"	C = 4 NC = 1	
		Already aware of information	C = 5 NC = 0	Participants already knew information that was being presented

7. Quality of program components	**Negative personal training**	Hard to schedule	C = 11 NC = 6	Hard to coordinate personal availability with trainer availability; trouble contacting trainer
		Lack of knowledge	C = 4 NC = 9	About training in general; about program; about injury/ proper technique
		Disregard clients concerns	C = 4 NC = 3	Trainer not addressing clients concerns about desired training regimen; disregarding injury
		Inconsistent	C = 7 NC = 1	Trainer was changed (due to any number of reasons including schedule incompatibilities)
		Not happy with training	C = 4 NC = 3	Participant deemed trainer's exercise plan ineffective, insufficient and/or inappropriate
	Positive personal training	Was "good"	C = 9 NC = 3	Participant characterized trainer as being generally "nice", knowledgeable, and/or motivating
		Liked workout	C = 4 NC = 3	Participant deemed trainer's exercise plan effective, sufficient and/or appropriate
	Negative dietician	Not helpful	C = 7 NC = 0	Not happy with session; information given was too basic and/or "common sense"
		Hard to schedule	C = 1 NC = 4	Difficultly in figuring out how to contact dietician/ set up an appointment
	Positive dietician		C = 4 NC = 0	General "liked"; liked diet plan; participant deemed dietician knowledgeable
	Negative email	Too much in them	C = 3 NC = 0	Too many attachments; too much information jammed into one email
8. Post- program implementation		Still exercising	C = 6 NC = 5	Still working out at the SRC; still meeting with trainer/ using trainer's workout plan
		Still following diet plan	C = 2 NC = 1	Still following diet plan that was used during program
9. Participation in program next year		Affirmative	C = 2 NC = 4	Ranged from "definitely yes", "I think so", and "most likely"
		Negative	C = 2 NC = 1	"Probably not"
10. Would participant recommend program		Affirmative	C = 6 NC = 5	Would recommend program to a friend
		Depends on…	C = 4 NC = 4	Participant would recommend to friend if friend was willing to work out alone, wanted to lose weight, or if program changes
11. Improvements/ suggestions		Increase social support	C = 8 NC = 5	Setting participants up with a "buddy" in the program; conducting training in groups; advertising for support groups
		Increase dose of program	C = 4 NC = 5	Need for more and better quality dieticians and personal trainers; more encouragement to utilize components
		Increase variety of offerings	C = 12 NC = 2	Offer different track programs; specific activities and/or utilizing the other programs that the student recreation center offers into the program; incorporate home exercise
		Increase feedback	C = 4 NC = 4	More assessments throughout; include a fitness assessment
12. Advice to others		Have specific goals	C = 4 NC = 3	Have specific goals set before entering program
		Utilize all components	C = 2 NC = 1	Use all components offered by program, even if only once
		Do with friends	C = 1 NC = 2	Increase social support and accountability by doing with friend

Note. C = completers (n = 11), NC = non-completers (n = 6).

Figure 1

RE-AIM index values for the Body for Break program



Reach

The Body for Break program had 547 individuals sign up using the online registration in early 2009. Of those 547 individuals, 405 subsequently completed the initial physiological assessment, and thus, started participating in the program. Therefore, 1.6% (405) of the 24,986 full-time students who were eligible for participation in the Body for Break program participated in the program. Hence, the Individual Participation Rate (IPR) for the program was .016 (405 / 24,986).

The Demographic Representativeness was calculated by comparing program participants with the full-time student body. The average age for the overall student population is 23.4 years. The average age for the program participants was 21.2 years (*SD* = 4.64).

For gender comparisons, Yates chi-square analysis revealed that a significantly greater percentage of women participated in the program (83.2%) than would be expected compared with the percentage of women in the population of the full-time student body (48.3%), χ^2 (1, *N*=24,295) = 199.36, *p*< .0001, *ES* = .089.

Concerning participants' year in school, the program was comprised of 24% freshman, 18% sophomores, 20% juniors, 24% seniors, and 14% graduate / professional students. However, Pearson chi-square analysis showed that a larger proportion of the overall junior class (23%) could be expected to participate in the Body for Break program than any other year, with the smallest proportion expected from the graduate / professional level (-25.9%), χ^2 (4, *N*= 27,009) = 30.02, *p* < .0001, *ES* = .033. Therefore, the overall Demographic Representativeness was .061 ([.033+.089] / 2). The *reach* index value was calculated to be 1.5 (0 to 100 scale).

Qualitative data from focus groups and individual interviews (*n* = 17) yielded reasons for initial attraction to join the program. The prominent sub-themes that emerged included for *physical reasons* (*n* = 7) such as "lose weight", "tone up", or "get in shape", for the *competition* component (*n* = 5), to *take advantage of services* (e.g., personal training, dietician; *n* = 7), and for *extra motivation* (*n* = 5).

Effectiveness

Of the 405 participants who completed the program's initial assessment, 93 returned to complete the post-assessment making the Individual Completion Rate equal to 23%. Paired-samples t-tests confirmed that all measures significantly differed from the initial assessment to the post-assessment on average for students who completed the eight week program (see Appendix B for Table 3), with effect sizes that ranged from small to large. The participants showed many significant changes including an average weight loss of 5.7 pounds (*SD* = 18.9), *t*(92) = 2.91, *p* = .004; an average decrease in BMI of .57 kg/m^2 (*SD* = .91), *t*(91) = 6.02, *p* < .001 an average decrease in resting heart rate of 8.8 beats per minute (*SD* = 16.9), *t*(89) = 4.95, *p* < .001, *ES* = .609; an average decrease in systolic blood pressure of 5.77 mmHg (*SD* = 13.2) *t*(89) = 4.16, *p* < .001; an average decrease in diastolic blood pressure of 4.41 mmHg (*SD* = 11.8), *t*(89) = 3.55, *p* = .001; an average decrease in body fat of 1.4% (*SD* = 2.7), *t*(88) = 4.82, *p* < .001, *ES* = .155; and an average decrease in waist girth of .77 inches (*SD* = 2.2), *t*(91) = 3.51, *p* = .001. Since the program was marketed as a fitness program, the markers of fitness from the assessment, resting heart rate and body fat, were the target variables for the *effectiveness* outcome assessment. Therefore, by taking into account the effect sizes for the

Table 3

Program completer characteristics and physiological data (T = 1 to T = 2)

	All (N=93)		Women (n=71, 76.3%)		Men (n=22, 23.7%)	
Program Completion Rate	23%		21.1%		32.4%	
Age group (n, %)						
17-19.9	23 (24.7%)		19 (26.8%)		4 (18.2%)	
20-21.9	37 (39.8%)		30 (42.3%)		7 (31.8%)	
22-23.9	21 (22.6%)		16 (22.5%)		5 (22.7%)	
24-25.9	2 (2.2%)		1 (1.4%)		1 (4.5%)	
26+	10 (10.8%)		5 (7.0%)		5 (22.7%)	
Class Status						
Freshman	17 (18.3%)		12 (16.9%)		5 (22.7%)	
Sophomore	18 (19.4%)		16 (22.5%)		2 (9.1%)	
Junior	15 (16.1%)		11 (15.5%)		4 (18.2%)	
Senior	22 (23.7%)		18 (25.4%)		4 (18.2%)	
Graduate/Professional	21 (22.6%)		14 (19.7%)		7 (31.8%)	
Measures (M+SD)	N=		N=		N=	
Weight (pounds)	93	164.4 ± 47.4	71	152.7 ± 37.9	22	202.2 ± 55.5
BMI[a] (kg/m²)	92	26.0 ± 5.4	70	25.4 ± 4.9	22	28.0 ± 6.4
RHR[b] (bpm)	91	73.6 ± 15.8	69	75.0 ± 16.3	22	69.3 ± 13.8
SBP[c] (mmHg)	90	124.9 ± 11.7	68	123.5 ± 11.9	22	129.1 ± 10.0
DPB[d] (mmHg)	90	74.6 ± 8.9	68	75.4 ± 8.6	22	72.2 ± 9.8
Body Fat %	89	28.5 ± 9.1	69	30.6 ± 8.1	20	21.6 ± 9.1
Waist (inches)	92	32.4 ± 5.6	70	31.1 ± 4.2	22	36.7 ± 7.1
Changes in Measures (M+SD)	N=		N=		N=	
Weight (pounds)	92	-5.7 ± 18.9	70	-5.5 ± 21.1	22	-6.4 ± 9.2
BMI[a] (kg/m²)	92	-.57 ± .91	70	-.46 ± .71	22	-0.9 ± 1.3
RHR[b] (bpm)	90	-8.8 ± 16.9	68	-8.2 ± 17.5	22	-10.7 ± 15.0
SBP[c] (mmHg)	90	-5.8 ± 13.2	68	-5.6 ± 13.2	22	-6.4 ± 13.2
DPB[d] (mmHg)	90	-4.4 ± 11.8	68	-7.0 ± 12.9	22	-7.0 ± 12.9
Body Fat %	89	-1.4 ± 2.7	69	-2.0 ± 4.1	20	-2.0 ± 4.1
Waist (inches)	92	-.77 ± 5.6	70	-1.2 ± 2.4	22	-1.2 ± 2.4

Note. All changes in measures are significant ($p < .05$).
[a]Body Mass Index, [b]Resting Heart Rate, [c]Systolic Blood Pressure, [d]Diastolic Blood Pressure.

changes in those variables, the averaged score for $Outcome_{Eff}$ = .38 ([.609+.155] / 2]).

Several two-way univariate repeated measures ANOVA revealed no significant interactions over time for gender and year in school for body fat and gender (*ES* = .015), body fat and year in school (*ES* = .013), resting heart rate and gender (*ES* = .089), resting heart rate and year in school (*ES* = .004), knowledge and gender (*ES* = .005), and knowledge and year in school (*ES* = .057). However, the moderate effect evident in changes in resting heart rate and gender exemplifies that the average change in resting heart rate is larger for men (-11 bpm) than women (-8 bpm). Thus, the value of the overall *effectiveness* was calculated by multiplying the Individual Completion Rate (ICR = .23), the averaged $Outcome_{Eff}$ (O_{Eff} = .38), and the Differential Impact (DI = [1 - .03]), resulting in a value of 8.5 (0 to 100 scale). By combining the *reach* and *effectiveness* index values the individual level impact of the program was 13.1 (0 to 100 scale; *reach* * *effectiveness*; Glasgow et al., 2006).

From the qualitative data, the most prevalent sub-themes of positive results were *physique improvements* (*n* = 11) (e.g., weight loss/ inches decrease/ body fat loss), *increases in knowledge* (*n* = 10), and *increases in motivation* (*n* = 7).

Concerning negative effects, the major sub-theme that emerged illustrated a perceived lack of effectiveness of the program pertaining to not losing weight and/or not seeing results. Interestingly, a majority of these comments came from individuals who completed the program. Concerning negative results, such as injuries obtained as a result of participating in the program, the post-program survey showed that 4.3% of completers reported an injury.

Implementation

The program was designed with four components: access to personal training, access to a dietician, weekly motivational/informational emails, and a support group. The use of any or all of the components was optional. Component utilization was assessed via two informational sources: the program evaluation survey, which was administered online at the end of the program, and through focus groups and interviews. Of the 100 individuals who completed the program evaluation survey, 72% read the motivational emails, 73% used the personal training component, and 37 % used the dietician. Due to a lack of interest from participants, the support groups were cancelled and thus, not delivered as a program component. Approximately 15% of individuals who completed the program evaluation survey utilized all of the three offered components. However, because the support group component would have been delivered had participants shown interest, it is calculated into the Component Participation Rate. The averaged $implementation_{Indiv}$ index was calculated to be 45.5 (0 to 100 scale).

On the program evaluation survey, several participants indicated a need for support groups. One response stated: "I didn't know anything about the support groups and I was trying to see if there was one." As well, a program completer commented: "I don't know how they had [the support groups] set up but that could have been useful."

Enough of the participants commented on effectiveness having to do with fully utilizing the program – either for themselves or as advice to others – that it emerged as a sub-theme in the qualitative data.

On a five point scale, the personal training component had an average quality rating of 4.56 (*SD* = .12), the dietician component had an average quality rating of 3.54 (*SD* = .27), and the weekly emails component had an average quality rating of 3.71 (*SD* = .14). For the undelivered support groups, the average quality rating was not calculated. Therefore, the average quality rating of the three delivered components was 3.94 (*SD* = .72), leading to an overall value for $implementation_{Org}$ of 79 (0 to 100 scale).

Interestingly, the qualitative data illustrates a discrepancy with the high $implementation_{Org}$ index value. Of all of the qualitative codes generated during the analysis, *negative personal training experiences* (*n* = 58) occurred most frequently. The participants unanimously agreed that a foremost negative factor was that the appointments were *hard to schedule* (*n* = 17) due to several reasons including a high demand for the service and coordinating availability with their schedules.

Another prominent negative factor affecting the quality of the personal training services was the *trainer's lack of knowledge* (*n* = 13; e.g., about program, training, and/ or injury). This reason was almost unanimously cited by program non-completers. In addition, *not happy with training routine* (*n* = 7) and *trainer disregarded client's concerns* (*n* = 7) were also frequently cited sub-themes.

Concerning the dietician component, the *positive dietician experiences* (*n* = 4) that emerged from the data were scarce. The *negative dietician experiences* (*n* = 14) that were most frequently cited were *hard to schedule* (*n* = 5) and *not helpful* (*n* = 7). It should be noted that *not helpful* was exclusively stated by program

completers. Concerning scheduling trouble, reasons cited had to do with not knowing how to contact the dietician.

Throughout the focus groups and interviews, the weekly email was not a frequently discussed component. A negative factor associated with the weekly emails were that there was *too much* information (n = 3) in them (e.g. attachments, links).

Concerning participants being "turned off" by the program early on, the primary sub-theme revolved around general confusion at the start of the program and negative experiences with the personal training component of the program.

Discussion

This study is the first to use the RE-AIM framework to systematically evaluate the overall impact of a single-site health promotion program delivered on a college campus. Qualitative data provided possible explanations for the values and suggestions for improvement, illustrating the utility of a mixed-methods research design in evaluation studies.

The Body for Break program *reach* (1.5/100) and *effectiveness* (8.5/100) were low, with moderate *implementation* on the individual level (45.5/100) and high *implementation* on the organizational level (79/100). Overall, the individual level impact of the Body for Break program was low at 13.1 (*reach* * *effectiveness*; Glasgow et al., 2006). Does that mean it is not worth continuing to run the program annually? As far as public health impact, a more parsimonious intervention might better serve the student body. However, if the Body for Break program goals were to simply make small improvements to participants' physique and fitness for the upcoming spring break then, as evident in the outcome changes, the program served its purpose for approximately 23% of those who participated.

The benefits of such a program for college students should not be lost in that it is in line with public health initiatives such as *Healthy Campus 2010* (American College Health Association; 2007) and addresses the population of young adults that is neglected in the research (Gokee-Larose et al., 2009a; Gokee-Larose et al., 2009b; Nelson et al., 2008). Through incorporating suggested changes, the Body for Break program and other similar programs for college students could increase *reach*, *effectiveness*, *adoption*, *implementation* and *maintenance* and thus, increase the overall impact.

Implications for Research and Practice

Few programs have targeted college students in particular (Gokee-Larose, et al., 2009b; Nelson et al., 2008) and most research on weight-loss and/or fitness programs efficacy is conducted on other populations such as children, adolescents and older adults (Gokee-LaRose et al., 2009a). Thus, since most individuals over the age of 18 are considered 'adults' they are delivered the standard 'adult' (ages 18 - 65) intervention, which may not be the most efficacious for young adults given their unique developmental considerations. In fact, Gokee-Larose et al. (2009a) determined that young adults are dramatically underrepresented in weight-loss trials, showed significantly less weight-loss than older participants, and that lower attendance and retention among young adults contributed to those findings. They suggested that strategies such as shorter duration of treatment and tailoring topics to the age group were effective in drastically increasing attendance and retention, as well as significantly decreasing weight over the 10-week program and maintaining this loss to the 20-week follow-up (Gokee-LaRose, et al., 2009b). Gokee-LaRose et al. (2009a) also suggested that program advertising focusing on health-messages may not be as effective for recruiting young adults as is it for older adults. Interestingly, Body for Break did all of these things: although there was not an age-limit on eligibility, the average age of participants was 21.2 years; the program was a short duration of eight weeks; and the primary marketing strategy appealed to vanity rather than health. Even with all of these suggestions covered, the Body for Break program exhibited a low impact on this population of young adults. Gokee-LaRose et al. (2009a) acknowledged that the above suggestions have not been adequately

researched within the target population and called for future studies to address these issues via qualitative research. Thus, the information ascertained by the qualitative component of this study could serve to fill a deficiency in the relevant literature and help inform suggestions for the Body for Break program and similar programs for young adults and college students.

The RE-AIM model does not provide methods to change the evaluated outcomes. Therefore, this study illustrates the importance of obtaining complimentary qualitative data, especially when seeking to remediate the low *reach* and *effectiveness* and mediocre individual-level *implementation* of the program. These suggestions for program improvements were compiled from a review of relevant literature and the qualitative findings of this study:

1. *Provide social support.* Participants' suggestions for improvement illustrated a lack of social support. These suggestions include setting participants up with a "buddy" in the program, conducting training in groups, and advertising for support groups to ensure enough participants for delivery. In addition, the support groups could also serve as the arena where the behavioral component of the intervention is delivered (e.g., goal-setting, time management, other cognitive-behavioral strategies), which was lacking in the Body for Break program but have been shown to be critical components of effective lifestyle change.

2. *Increase the dose of the program*. Because component use was optional, individual implementation of the program varied greatly. In such programs, there must be enough resources of sufficient quality so that all participants could receive the maximal (and most effective) dose of the program. Putting some of these components online or providing to multiple individuals at once (e.g., support or training group) could alleviate stress on program staff/resources and facilitate more participants accessing the multiple arms of the intervention. Any incentives used in the future might be most effective if tied to overall participation in the program instead of using the student recreation center and attending the pre- and post-measurements.

3. *Increase variety of offerings*. Instead of using a canned approach, it was suggested by participants that the program offer different track programs based on exercise history and fitness/weight-loss goals. These options could also be done in conjunction with determining the intensity of the personal training component needed (e.g., one-on-one supervision versus online training program), which would help to efficiently allocate resources. Other ways that variety could be increased includes suggestions for having specific program activities and/or utilizing the other programs that the student recreation center offers into the Body for Break program (e.g., group exercise classes for participants). This strategy could serve to provide opportunities to increase self-efficacy and provide additional social support within the program, as well. One-third of the focus group/interview participants lamented that exercise done at home was not counted toward participation in the program. If it could be possible to include this, through online logs for example, it would allow participants to vary the environments in which they receive the intervention. Lastly, offering a variety of prizes that appeal to both genders may help to increase extrinsic motivation and possibly retention.

4. *Increase feedback and accountability*. Assessments were offered before and after the eight-week program. A need for receiving more feedback on progress throughout the program was expressed, such as more assessments (e.g., a four-week assessment), and additional weekly weigh-ins, especially when motivation started to wane in the latter weeks of the program. Some commented that they wanted a more thorough assessment that includes aspects of fitness. As suggested by Abildso (2008), it may also be beneficial to have participants' complete self-report questionnaires on

concepts such as self-esteem, self-efficacy and exercise barriers at multiple times throughout the program to discern changes in these variables in addition to body composition. Participants also expressed that there was a significant amount of confusion early on concerning what to do during the program and how to access services. Providing a more comprehensive orientation at the onset could minimize confusion pertaining to program participation. Estabrooks and Gyurcsik (2003) suggest assessing participant knowledge and understanding of the intervention components at the start of the intervention to remedy misunderstandings before they interfere with intervention effectiveness.

Limitations of the Study

First, procedures and measurements on which the *effectiveness* dimension evaluation was based were not standardized. Namely, body measurements (e.g., thigh and waist circumference) were conducted by several individuals potentially utilizing different techniques both within assessments and between assessments. Also, body fat and weight were measured using electrical impedance with a Tanita-brand scale. This equipment had an option to account for clothing weight, as well as different settings for 'athlete' and 'normal'. As these specific settings were not recorded at baseline, it is unknown if these settings were kept constant between the initial and final assessment. In addition, the *maintenance* dimension of the RE-AIM framework was not addressed in the study. Thus, conclusions about the long-term results of the program cannot be drawn.

Further, concerning the purpose of the program as a "fitness program", measuring the effectiveness of the program on that particular construct was limited in that there were not any direct measures of fitness taken, such as VO_2 max or a more comprehensive fitness test such as the ACSM Fitness Testing Battery (American College of Sports Medicine, 2003).

References

Abildso, C. (2008). *Evaluating an insurance-sponsored weight management program using the RE-AIM model.* Doctoral dissertation, West Virginia University, 2008.

Abildso, C., Zizzi, S., & Reger-Nash, B. (2010). Evaluating an Insurance-Sponsored Weight Management Program With the RE-AIM Model, West Virginia, 2004-2008. *Preventing Chronic Disease, 7(3).* Retrieved July 1, 2010, from http://www.cdc.gov/pcd/issues/2010/may/09_0114.htm.

American College Health Association. (2010). American College Health Association National College Health Assessment: Reference Group Data Report Fall 2009. Baltimore: American College Health Association.

American College of Sports Medicine. (2003). *ACSM fitness book.* (3rd ed.) Champaign, IL: Human Kinetics Press.

Centers for Disease Control and Prevention. (2007). Behavior risk factor surveillance system: 2007 prevalence data. Retrieved January 3, 2009, from http://apps.nccd.cdc.gov/brfss/

Estabrooks, P.A., Dzetwaltowski, D.A., Glasgow, R.E., & Klesges, L.M. (2003). Reporting of validity from school health promotion studies published in 12 leading journals, 1996-2000. *Journal of School Health, 73(1),* 21-28.

Glasgow, R.E., Klesges, L.M., Dzewaltowski, D.A., Bull, S.S., & Estabrooks, P. (2004). The future of health behavior change research: What is needed to improve translation of research into health promotion practice? *Annals of Behavioral Medicine, 27(1),* 3-12.

Glasgow, R.E., Klesges, L.M., Dzewaltowski, D.A., Estabrooks, P.A., & Vogt, T.M. (2006). Evaluating the impact of health promotion programs: using the RE-AIM framework to form summary measures for decision making involving complex issues. *Health Education Research, 21(5),* 688-694.

Glasgow, R.E., Vogt, T.M., & Boles, .S.M. (1999). Evaluation the public health impact of health promotion interventions: The RE-AIM framework. *American Journal of Public Health, 89*, 1233-1327.

Gokee-LaRose, J., Gorin, A.A., Raynor, H.A., Laska, M.N., Jeffery, R.W., Levy, R.L., et al. (29 September 2009a). Are standard behavioral weight-loss programs effective for young adults? *International Journal of Obesity*. Advance online publication. doi: 10.1038/ijo.2009.185.

Gokee-LaRose, J., Gorin, A.A., Wing, R.R. (2009b). Behavioral self-regulation for weight loss in young adults: a randomized controlled study. *International Journal of Behavioral Nutrition and Physical Activity, 6 (10)*. doi: 10.1186/1479-5868-6-10.

Holloway, I. (1997). *Basic Concepts for Qualitative Research*, Oxford: Blackwell Science.

McCracken, M., Jiles, R., & Blanck, H.M. (2007). Health behaviors of the young adult US population: Behavioral risk factor surveillance system, 2003. *Preventing Chronic Disease, 4(2).* Retrieved January 18, 2009, from http://www.cdc.gov/pcd/issues/2007/apr/06_0090.htm

McTigue, K.M., Garrett, J.M., & Popkin, B.M. (2002). The natural history of the development of obesity in a cohort of young adults between 1981 and 1998. *Annals of Internal Medicine, 136(12),* 857-864.

Nelson, M.C., Story, M., Larson, N.I., Neumark-Sztainer, D., & Lytle, L.A. (2008). Emerging Adulthood and college-aged youth: An overlooked age for weight-related behavior change. *Obesity, 16,* 2205-2211.

Racette, S.B., Deusinger, S.S., Strube, M.J., Highstein, G.R., & Deusinger, R.T. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health, 53(6),* 245-251.

Tavares, L.S., & Plotnikoff, R.C. (2008). Not enough time? Individual and environmental implications for workplace physical activity programming among women *with* and *without* young children. *Health Care for Women International, 29,* 244-281.

Toobert, D.J., Strycker, M.A., Glasgow, R.E., Barrera, M., & Angell, K. (2005). Effects of the Mediterranean Lifestyle Program on multiple risk behaviors and psychosocial outcomes among women at risk for heart disease. *Annals of Behavioral Medicine, 29(2),* 128-137.

US Department of Education National Center for Education Statistics (2007). Digest of Education Statistics: 2007.

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