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Using Behavior Change Plans to Improve Medical Student Self-Care

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Abstract

Purpose—To describe an innovative approach to teaching medical students the principles and practice of health behavior change and self-care using a Behavior Change Plan (BCP).

Method—Second-year medical students at Northwestern University Feinberg School of Medicine ($n = 343$) took a required Healthy Living unit in 2008 or 2009. They completed a BCP project in which they selected a personal behavior to change (exercise, nutrition, sleep, personal habits/hygiene, study/work habits, or mental/emotional health), set a goal, tracked progress, and self-assessed success. The authors employed a one-group posttest-only design to conduct a quantitative analysis and a qualitative evaluation of students' BCPs and their attitudes concerning the project.

Results—Among the 343 students, 299 (87.2%) set BCP goals related to exercise, nutrition, or sleep. BCP outcomes varied: 139 students (40.5%) achieved their goal, 170 (49.6%) failed to do so, and 34 (9.9%) were uncertain. Factor analysis produced two independent attitude scales: utility ($\alpha = .80$) and burden ($\alpha = .67$). Logistic regression showed that success approached statistical significance only in the sleep behavior category and for the utility attitude scale. Qualitative case reports provide insights about BCP targets, management, and results. After completing the assignment, 274 (79.9%) of the students considered themselves to be healthier and 281 (81.9%) indicated they would use the process again.

Conclusions—Completing a BCP is a valuable and effective exercise that enables medical students to practice the strategies and skills and experience the obstacles of changing health behavior.

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The saying “Physician, heal thyself” alludes to physicians' readiness to treat others while sometimes not attending to self-care. The Institute of Medicine highlighted physician well-being and the need to teach medical students how to care for themselves in its 2004 report on “Improved Medical Education: Enhancing the Behavioral and Social Science Content of Medical School Curricula.”¹ Establishing and maintaining personal health habits is important for medical students as such habits affect their academic performance, emotional regulation, and future functioning as physicians.² Although research shows that medical students report many good health behaviors compared with other young adults in the United States,³ their adjustment to the rigors of medical school can reduce self-care behaviors.⁴ Other research suggests that physicians' beliefs and behaviors predict their behavior in practice; that is, healthier personal practices predict the counseling of patients about preventive interventions.^{5,6} For this reason, the Surgeon General's recent “Vision for a Healthy and Fit Nation” “encourage[s] clinicians and their staff to practice healthy lifestyle behaviors and be role models for their patients.”⁷ Medical students should also, therefore, learn behavior change skills and techniques to recognize the challenges inherent in changing personal health behaviors, which will ultimately help their patients.

Attention to self-care and health behavior among medical students is becoming an increasingly important objective of medical education. At Northwestern University Feinberg School of Medicine (NUFSM), a yearlong initiative examining competencies led to the adoption in 2009 of “Personal Awareness and Self-Care” as one of the eight competencies students must reach by graduation.⁸

To address the Personal Awareness and Self-Care competency, in 2008 NUFSM introduced into the second-year curriculum a required Healthy Living unit. The goals of the Healthy Living unit are to (1) demonstrate the importance of lifestyle practices in health maintenance and disease prevention, (2) illustrate practical lifestyle counseling strategies and skills to improve health behaviors, and (3) promote student well-being by endorsing improved self-care behaviors. The theme of student self-care is addressed via a Behavior Change Plan (BCP), in which students attempt to change one of their own health behaviors.

In this report, we describe NUFSM's BCP activity and present the health behaviors two cohorts of students selected for modification. We report BCP outcomes and their correlates among the students, and we discuss reasons for students' successful and failed efforts to change health behaviors.

Method

Study design

We employed a one-group posttest-only design⁹ to conduct a quantitative evaluation of NUFSM medical students' self-care BCPs. To amplify the quantitative data, we also created case reports to present qualitative examples from two students' BCPs; these identify their reasons for goal selection, the sources of their successes and failures, and their insights about changing their behavior to achieve a healthier lifestyle.

Participants

We analyzed data from the 343 second-year medical students in the classes of 2010 and 2011; they completed the Healthy Living unit requirement in 2008 and 2009, respectively. The students were divided equally by gender (172 men, 171 women). On their medical school application forms, the students reported their ethnic distribution as 162 (47.3%) white, 98 (28.6%) Asian, 25 (7.4%) black, and 12 (3.6%) Hispanic; 46 (12.6%) did not specify. At the time of enrollment, 218 (63.5%) of the students were 24–26 years old.

The NUFSM Institutional Review Board approved this study. All students provided informed consent before they began the BCP activity.

Healthy Living unit

All 343 second-year medical students took the six-week, 12-hour Healthy Living unit during the winter quarter of the academic year. Each class of students was divided into two groups, and the unit was repeated twice weekly to reduce the student–faculty ratio. The weekly, 2-hour sessions began with didactic presentations, which were followed by an experiential breakout activity when possible. Selected reading assignments were provided as background information for each session. Topics included stress and coping, diet and nutrition, physical activity and exercise, sleep hygiene, smoking cessation, principles of behavior change, and obesity care. To engage students in the learning process, faculty embedded knowledge, attitude, and behavioral questions in the presentations; students answered using an audience response system. Unit requirements included mandatory attendance and completion of the BCP.

Behavior Change Plan

The specific goals of the BCP project are to identify a specific health behavior for change, set goals, establish a practical and achievable change plan, and perform self-monitoring. The BCP activity is grounded in behavior therapy,¹⁰ which gives individuals a set of principles and techniques to modify their health habits¹¹ with the aim of helping them acquire behavior change skills. Self-monitoring and goal setting are two important outcomes. Self-monitoring is the cornerstone of behavior therapy and its purposes are to increase habit awareness, assess and reflect on habits, set a plan, reduce unhealthy habits while reinforcing healthier ones, and establish accountability. Individuals are taught to set specific (i.e., quantifiable) and realistic behavioral goals that address what, when, and how behavior will be targeted for change.

During the first week of the unit, students in the classes of 2010 and 2011 received the following written instructions for the BCP assignment:

1. Choose a target behavior in one of six themes: (1) exercise, (2) nutrition, (3) sleep, (4) personal habits/hygiene, (5) study/work habits, (6) mental/emotional health. Your choice should include a rationale, what you hope to learn or achieve, and why.
2. Monitor your current patterns of behavior. For at least 2 weeks, you must chart the target behavior and record frequency data. Examples include hours of sleep, daily consumption of fruit or vegetable servings, and minutes of exercise per week. Record behavioral frequency, settings or conditions, and feelings if pertinent.
3. Learn about the target behavior, including recommendations, standards of care, or guidelines. Identify at least 3 resources that address the behavior using articles, books, or Internet sites. Information should be summarized and cited.
4. Set personal goal(s) and develop a change plan. The goal should be specific—a clear cut goal you intend to accomplish. Include what, when, where, and how. For example, “I will exercise using the elliptical machine 2 days weekly (Tuesday and Friday) for 30 minutes.”
5. Monitor your change plan. Over the next 6 weeks, track your progress using a chart, graph, spreadsheet, or list. Keep a journal throughout the process, recording the frequency of the new behavior, slips, high-risk situations for relapse, and your feelings. Record the “sabotaging” or “entitlement” thoughts that lead you away from performing the behavior to understand the role cognition plays in behavior

change. Recognize the need to respond to thoughts appropriately to maintain change.

To document their BCP, students were required to submit two forms (see Supplemental Digital Appendix, [LWW INSERT LINK]). The first, which they submitted at the end of the six-week unit, encompassed steps 1 through 4 (baseline behavior and how they planned to change it). The second, which they submitted six weeks after the end of the unit, addressed step 5 (what they actually did). They submitted both forms electronically as e-mail attachments to the unit director (R.F.K.). Students were sent three e-mail reminders over the six weeks following the unit to provide reinforcement and encourage completion of the assignment.

Measurements

We categorized students' first BCP forms into six major themes (i.e., type of behavior chosen) and then into subtopics (i.e., type of goal), such as inclusion or elimination of specific food groups or type of exercise chosen. We also grouped BCPs by whether students planned to increase or decrease a selected behavior.

We analyzed students' responses to questions on the second BCP form about whether they achieved their goal, the most important factors that helped or hindered their success, and whether they would use this approach toward other problem behaviors. The second form also included seven attitude items that asked students to evaluate the importance and value of the BCP using a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5).

Standard setting

Upon completion of the BCP, students were asked to decide whether they had achieved their established goal. This was a self-determined decision in one of three categories: yes, no, uncertain.

Data analysis

We performed the data analysis in five steps. First, we calculated descriptive statistics to tabulate goal achievement success rates for BCPs for each of the six themes. Second, we factor analyzed the seven attitude items (PA2, varimax rotation) to reduce the item data to composite scales. Third, we estimated internal consistency reliability (Cronbach's alpha) for each composite scale. Fourth, we used logistic regression to account for BCP success or failure in four behavior change categories: exercise, nutrition, sleep, and personal habits (an aggregate of personal habits/hygiene, study/work habits, and mental/emotional health). We did not include in this analysis the BCPs with uncertain outcomes. The logistic regression model included the four behavior change categories and three other variables: gender and two scale scores derived from the factor analysis. Fifth, we composed two BCP case reports to give qualitative meaning to the quantitative data.

Results

The health behavior topics the 343 students chose and their assessment of whether they achieved their BCP goal are shown in Table 1. From the six themes, the majority of students (299 or 87.2%) selected one of three behaviors to modify: exercise (153 or 44.6%), nutrition (94 or 27.4%), or sleep (52 or 15.2%). Subcategories for the exercise behavior included cardiovascular training, resistance training, and a combination of the modalities. Subcategories for the nutrition behavior included fruit and vegetable consumption, nighttime eating, cooking meals, and changes in soda, caffeine, or calcium intake. Subcategories for

the sleep behavior included amount of sleep, wake-up time, and maintaining a consistent sleep schedule.

Each student set a goal for his or her selected behavior, indicating intent to modify the behavior by either increasing an activity (e.g., exercise more times per week, eat more fruits and vegetables) or by decreasing one (e.g., reduce nail biting, limit intake of dietary salt). After completing the BCP, half of the students (170 or 49.6%) reported that they had not reached their specified goal while 34 (9.9%) were uncertain of their success, reporting that they achieved some aspect of but not the entire goal. Upon inspection of the students' BCP narratives and graphs, it was apparent that almost all students implemented some degree of behavior change. By self-report, 274 (79.9%) of students indicated that they were healthier after completion of the project. Most (281 or 81.9%) indicated that they would use this approach again toward other problem behaviors.

The factors students commonly cited as the most important in achieving their goal were setting aside time or planning in advance, charting increased awareness about when or why they were engaged in the behavior, seeing results physically or mentally, feeling better emotionally, being motivated to stick to the plan, and adjusting their environment. The most common factors they cited in not achieving their goal were being too busy studying, finding it hard to change routine, being too busy in general, being sick or injured, setting expectations too high, and being too stressed.

Students' responses to the seven attitude items showed that they perceived the BCP to have importance and value (Table 2). Our factor analysis revealed that two independent factors accounted for most of the variation in the item response data (details available on request). The two factors are represented in Table 2 as separate scales we called utility (5 items, $\alpha = .80$) and burden (2 items, $\alpha = .67$).

Table 3 presents results from the logistic regression to account for BCP success or failure in the four behavior change categories using the gender, utility, and burden variables. Our logistic regression analysis showed that success only approached statistical significance in the sleep behavior category and for the utility attitude scale. None of the other variables in the regression analysis explained a significant proportion of variance in the data.

The case reports we composed are presented below. These use two students' BCPs to exemplify the most common behaviors chosen (exercise and diet) and demonstrate successful and unsuccessful goal achievement. Excerpts from the students' reports are included.

Case Report 1

Student 1 set his goal as getting 60 minutes of exercise (20 minutes of cardiovascular training and 40 minutes of weight-lifting) five times each week at a local gym. He decided on this BCP because “often the first thing that gets cut out of my schedule is exercise because of perceived lack of energy and/or time. However, I believe that exercising 60 minutes a day will help me focus more while studying and also help me get better sleep.” His baseline monitoring showed that he went to the gym three times the first week, but only once in the following two weeks. During the six weeks he implemented his BCP, he was able to steadily increase his exercise to five times per week (Figure 1). Student 1 reported, “The most important factor in achieving the goal was my motivation to remain healthy while being busy with my M2 workload. Also, my roommate motivated me to go to the gym with him.” Student 1 learned that “it is easier to set a goal than to actually carry it out. While I had an ambitious goal ..., I was not 100% successful although I did make improvements.”

Case Report 2

Student 2 chose to increase her intake of fruits and vegetables, because “vegetables can reduce the risk for heart disease, stroke, and some cancers.” She monitored her baseline intake for three weeks, and found that she ate 1 or 2 servings per day (primarily one apple and sometimes some carrots or broccoli). She set her goal as 4 servings per day. After implementing the BCP for six weeks (Figure 2), Student 2 indicated that “I made a nice improvement in increasing my average intake of fruits and vegetables from 1.5 to 3.5 servings/day, but I failed to meet my goal.” She identified as barriers to behavior change school and stress (“I definitely fell off right before the exam because I was stressed and ate some junk food because it was easier to get”); being too busy (“It was hard to get to the market because I was too busy or too busy to cook even if I had food”); and having limited choices (“I think I need to branch out more and eat more things in the fruits and vegetables category to have a chance to really meet this goal without getting sick of what I currently eat”). Student 2 learned “how difficult it is to manage a change when school or a job is very stressful and makes you work long hours.”

Discussion

This study shows that the principles and practice of health behavior can be successfully introduced into the medical school curriculum. The BCP provides second-year NUFSM students with an opportunity to experience and implement behavior change strategies while improving their personal health. The fact that only 40.5% of the students in this study reported achieving their goals is not surprising given the highly competitive demands placed on them and their own high expectations. Our review of the individual BCP narratives and graphs showed that almost all students improved their chosen health behaviors. It is noteworthy that even though they did not all achieve their goal, 79.9% of students indicated that they were healthier after completing the BCP. Students' responses on the seven attitude items indicate that they perceived the BCP as valuable, and 81.9% would use this approach again for other problem behaviors. We anticipate that this “real world” experience will strengthen students' empathy toward patients who struggle to improve health behaviors and foster health behavior counseling.

The quantitative and qualitative data within this study are complementary. Quantitative results show students' difficulties with designing and managing a successful BCP due to the deep-rooted character of target behaviors; pressures, distractions, and stressors; and students' own high standards for success. Qualitative data, highlighted in the two case reports, amplify the quantitative outcomes by revealing the importance of motives and barriers to behavior change successes and failures.

Limited data are available on the health practices of U.S. medical students, but they are considered to be generally healthier than other young adults. In a 2003 survey of first-year medical students, Frank et al³ found that 84% reported never having smoked cigarettes and that students exercised a median of at least 4 hours per week and slept a median of 7 hours per night. Nearly 97% reported their health to be at least good. However, students' adjustment to the academic and workload demands of medical school has been reported to result in mental health declines that manifest in increased rates of anxiety, sleep deprivation, depression, and personal distress. Burnout, defined as the combination of emotional exhaustion, depersonalization, and low personal accomplishment, has been reported to occur in 45% of medical students.¹² Although we did not measure stress directly in this study, students commonly cited workload pressures, busy schedules, and high expectations as major barriers to achieving their BCP goal.

Other researchers have introduced curricula in student self-behavior change using various formats. Rakel and Hedgecock¹³ created a Web-based health tool for students called “Healing the Healer” that helps students define their own health goals, while encouraging self-reflection, promoting positive lifestyle habits, and educating about the foundation of health. Survey data from 500 users supported the potential usefulness of the tool. Moser et al¹⁴ described a 60-hour Health Beliefs and Behavior (HBB) course, required during the third-year internal medicine clerkship, dedicated to training students in behavior change techniques. The HBB course specifically addressed the behavioral and social science domains emphasized in the 2004 IOM report on improving U.S. medical education.¹ One component of the HBB course was an assignment in which students self-selected a behavior they wished to change, attempted to change it, and reported back to the class on their experience. The authors did not include outcome data for the assignment.

Hassed et al¹⁵ introduced a Health Enhancement Program (HEP) for first-year students using an ESSENCE lifestyle model (Education, Stress management, Spirituality, Exercise, Nutrition, Connectedness, Environment) that emphasized mindfulness practices. Students employed this approach to promote awareness, conscious choice, and behavior change strategies when setting their own health improvement agenda. The authors measured the program's impact on student psychological distress and quality of life using established instruments. In their comparison of pre- and post-course scores, they noted improved student well-being for depression and hostility but not for anxiety. Our study builds on these published classroom activities and further reinforces the value of adding curricula focused on student self-care activities.

Our study has limitations. It was conducted at a single institution and involved two cohorts of students. Post-test results cannot be compared with pre-test data as the latter were not collected. Further, the results may not be generalizable to other medical schools. The next steps in research on the BCP include amplification in two directions. We will conduct follow-up studies of other NUSFM student cohorts to ascertain whether their experience with the BCP affects their patient care practices and self-care behaviors. We will also use the formative evidence obtained from the classes of 2010 and 2011 to strengthen the Healthy Living unit and BCP project for subsequent groups. For example, based on these two cohorts' responses on the BCP forms, we now assess attainment of the BCP goal as a categorical percentage of success (0%, 1–25%, 26–50%, 51–75%, 76–99%, 100%) rather than asking whether the goal was achieved (yes, no or uncertain). We believe this more accurately captures the degree of success in achieving behavior change and more realistically reflects experiences seen among patients who are trying to change their behavior.

In summary, our analysis shows that the BCP activity is a valuable exercise that improves students' personal health behaviors and helps them experience the strategies, challenges, and obstacles of changing health behavior. We hope that the experience will also help students be more empathetic and supportive of patients who are implementing health behavior changes. We anticipate that, having acquired knowledge and skills, students will use the BCP approach toward future personal behavior changes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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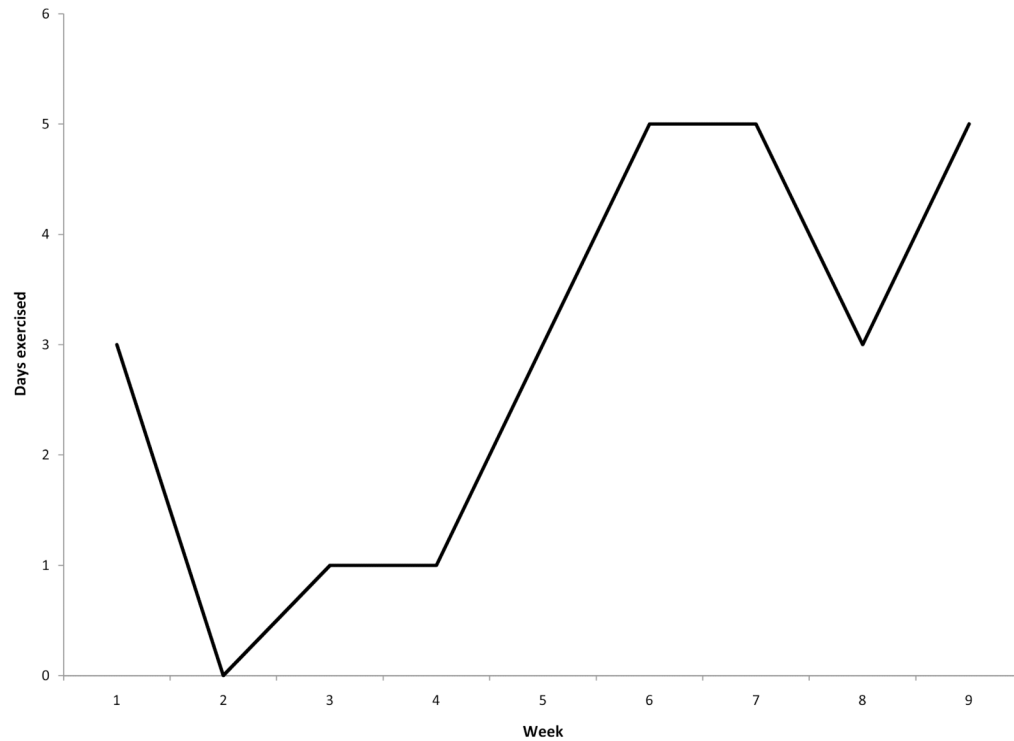


Figure 1.

Exercise log for Student 1. His behavior change plan (BCP) goal was to get 60 minutes of exercise 5 times per week at a local gym. At baseline (weeks 1–4), he exercised 0–3 times per week. After implementing the BCP for 6 weeks, he was able to steadily increase his exercise to 3–5 times per week.

Week	Days exercised
1	3
2	0
3	1
4	1
5	3
6	5
7	5
8	3
9	5

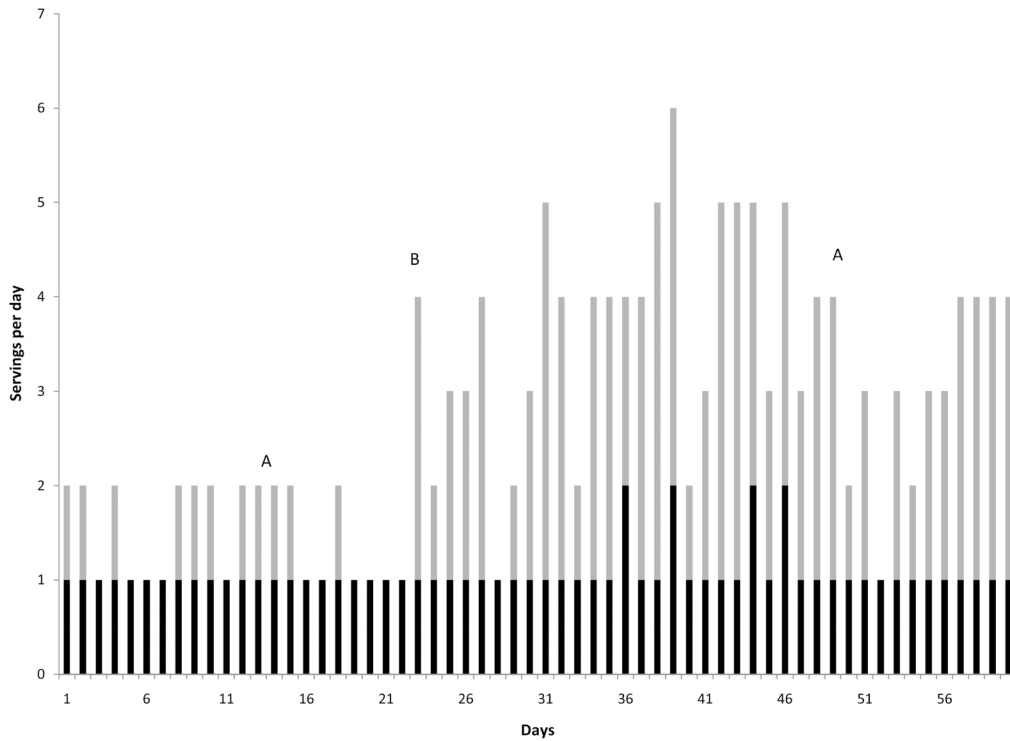


Figure 2. Fruit and vegetable intake log for Student 2. Her behavior change plan (BCP) goal was to increase her fruit and vegetable consumption to 4 servings per day. At baseline (weeks 1–3), she consumed 1–2 servings per day. After implementing the BCP for 6 weeks, she was able to increase her intake to 3.5 servings per day. Dark bars indicate fruit consumption; light bars, vegetable consumption. A indicates exam week; B, start of BCP.

Day	Servings of Fruit	Servings of Vegetables
1	1	1
2	1	1
3	1	0
4	1	1
5	1	0
6	1	0
7	1	0
8	1	1
9	1	1
10	1	1
11	1	0
12	1	1
13	1	1
14	1	1
15	1	1
16	1	0
17	1	0
18	1	1

19	1	0
20	1	0
21	1	0
22	1	0
23	1	3
24	1	1
25	1	2
26	1	2
27	1	3
28	1	0
29	1	1
30	1	2
31	1	4
32	1	3
33	1	1
34	1	3
35	1	3
36	2	2
37	1	3
38	1	4
38	2	4
40	1	1
41	1	2
42	1	4
43	1	4
44	2	3
45	1	2
46	2	3
47	1	2
48	1	3
49	1	3
50	1	1
51	1	2
52	1	0
53	1	2
54	1	1
55	1	2
56	1	2
57	1	3
58	1	3
59	1	3
60	1	3

Table 1
Healthy Living Behavior Change Goals Selected by 343 Second-Year Medical Students
and Their Self-Assessed Goal Achievement, Northwestern University Feinberg School of
Medicine, 2008 and 2009

Theme of behavior change goal	Goal selected, no. (%)	Goal achieved, no. (%)		
		Yes	No	Uncertain
Exercise	153 (44.6)	60 (39.2)	77 (50.3)	16 (10.5)
Nutrition	94 (27.4)	47 (50.0)	38 (40.4)	9 (9.6)
Sleep	52 (15.2)	14 (26.9)	36 (69.2)	2 (3.8)
Personal habits/hygiene	26 (7.6)	7 (26.9)	12 (46.2)	7 (26.9)
Study/work habits	9 (2.6)	5 (55.6)	4 (44.4)	0 (0.0)
Mental/emotional health	9 (2.6)	6 (66.7)	3 (33.3)	0 (0.0)
Total	343 (100.0)	139 (40.5)	170 (49.6)	34 (9.9)

Table 2
Responses of 343 Second-Year Medical Students to Seven Attitude Items Comprising the Behavior Change Plan's Healthy Living Scale, Northwestern University Feinberg School of Medicine, 2008 and 2009*

Scale and attitude item	Mean	SD
Scale 1: Utility ($\alpha = .80$)		
1. Recording my behavior was valuable.	4.16	0.98
2. I learned how to be healthier from the BCP.	3.79	0.91
3. Monitoring my behavior clarified my goals.	3.86	0.98
4. Monitoring my behavior was valuable.	4.30	0.84
5. The BCP was fun and enjoyable.	3.54	1.05
Scale 2: Burden ($\alpha = .67$)		
1. Monitoring my behavior was difficult.	3.15	1.29
2. Monitoring my behavior was time consuming.	2.56	1.13

* Students responded to each of the seven items using a 5-point Likert scale (strongly disagree = 1 to strongly agree = 5). BCP indicates Behavior Change Plan.

Table 3
Variables That Contributed to 343 Second-Year Medical Students' Success or Failure to Achieve Behavior Change Plan Goals, Northwestern University Feinberg School of Medicine, 2008 and 2009

Variable	No. (%) selected or mean (SD)	No. (%) successful	Odds Ratio (95% CI)
Behavior change goal category			
Exercise	153 (44.6%)	60 (39.2%)	.74 (.36-1.53)
Nutrition	94 (27.4%)	47 (50.0%)	1.21 (.57-2.57)
Sleep	52 (15.2%)	14 (26.9%)	.43* (.18-1.05)
Personal habits	44 (12.8%)	18 (40.1%)	Reference
Total	343 (100%)	139 (40.5%)	
Gender			
Female	171 (49.9%)	65 (38.0%)	Reference
Male	172 (50.1%)	74 (43.0%)	1.25 (.80-1.96)
Scale			
Utility ($\alpha = .80$)	19.65 (3.55)		1.06 [†] (.99-1.13)
Burden ($\alpha = .67$)	5.70 (2.10)		.98 (.87-1.09)

* $P = .06$

[†] $P = .08$