

Development and Evaluation of a Nutrition and Physical Activity Counseling Module for First-Year Medical Students

Pat F. Bass III, MD, MS^{*} Barbara A. Stetson, PhD[†], William Rising, PhD[‡],
Gina C. Wesley, PhD[†] and Christine S. Ritchie, MD, MSPH[‡]

^{*}Louisiana State University Health Science Center-Shreveport

[†]University of Louisville, Louisville, KY

[‡]University of Alabama, Birmingham

Abstract - Introduction: Few Americans follow recommendations regarding nutrition or physical activity, and few physicians provide nutritional counseling (NC) or physical activity counseling (PAC) to patients. Clinical, systems-based, and institutional barriers to teaching and providing NC and PAC exist, but theoretical models of behavior change and principles of adult learning theory (ALT) can enable medical educators to overcome these barriers.

Methods: We developed an educational intervention consisting of interactive lectures and two standardized patient experiences to provide first-year medical students with practical experience in PAC and NC. Students completed pre and post educational assessments of attitudes, knowledge, and self-efficacy with the counseling techniques.

Results: Knowledge scores increased from 6.1 to 8.5 ($p < .001$) on a 13-item test. Self-confidence scores for NC increased from 45 to 78 ($p < .001$), and self-confidence scores for PAC increased from 51 to 82 ($p < .001$). While overall attitudes regarding the necessity and utility of counseling with specific disease states were not different pre/post test (necessity pre/post 6.3 to 6.2 $p = .71$; utility pre/post 5.8 to 5.7 $p = .88$), necessity and utility scores for disease states treated primarily with counseling were different compared to disease states students perceive to be primarily pharmacologically treated (counseling vs. pharmacological necessity 5.9 vs. 6.6 $p < .001$; utility 5.4 vs. 6.1 $p < .001$).

Conclusion: An educational intervention based on theoretical models of behavior change and ALT can increase knowledge and self confidence scores regarding counseling for NC and PAC.

In a "Supersized America"¹, one third of adults and one fourth of children are obese.² Few adults and large numbers of children fail to adhere to dietary or physical activity recommendations.³⁻⁴ Although patients look to physicians for credible health information and research supports the effectiveness of simple counseling behaviors, few physicians actually provide physical activity (PAC) or nutritional counseling (NC) services to patients.⁵⁻⁹

Physicians have little practical knowledge of nutrition or physical activity counseling and under use nutrition professionals such as dietitians.¹⁰ Clinicians cite barriers to providing NC and PAC to patients including a lack of knowledge, a lack of appropriate skills, and perceived non-compliance of patients. A lack of organizational support and lack of reimbursement are additional systems-based issues preventing NC and PAC.⁵⁻¹¹

Most traditional medical school curricula address these topics in the preclinical years without reemphasis or building of additional skills.^{12,13} A lack of sufficient faculty trained in nutrition and physical activity, a lack of time in an ever expanding curriculum, a lack of funding for the development of new curricula, and a lack of a critical mass of role models are institutional barriers to including PAC and NC in the curriculum.¹⁴

If PAC and NC are to improve in physician practice, medical schools must target the elements of health behavior counseling that can be effected by curriculum and instructional changes.¹⁵ Students cannot learn to diagnose and treat a medical or surgical condition passively from a textbook or lecture. Likewise, behavioral counseling requires practical experiences in order for students to use and eventually master these skills. Adult Learning Theory¹⁶ posits students learn most effectively when counseling skills are taught in an environment where threat

to self is low; skills learned are directly related to clinical practice; the benefits of the activity are clear; the environment is supportive; and learning is an active process. Thus, providing training that improves students' confidence in counseling, increases the perceived benefits of counseling, and leaves students' feeling successful at PAC and NC may lead to improved skills in practice.¹⁵

However, the current medical curriculum presents few opportunities for students to practice or faculty to model NC or PAC skills. In a traditional curriculum, the topics would be covered in a lecture format, thus, not addressing any of the predictors of successful counseling in practice. Standardized patient (SP) experiences allow one to overcome many of the deficits of the traditional medical model by providing clinically relevant experiences to students. SP encounters simulate actual doctor patient interactions and allow students to apply new knowledge in a real life situation without the worry of potential harm to a patient. Not only do students receive immediate feedback regarding their performance, but students are also provided feedback in a patient centered manner giving insight into potential communication or professionalism issues they might not otherwise be aware of. SP educational experiences are non-threatening to students and allow the students to take "time-out" to ask questions, to obtain feedback, and to practice specific skills.¹⁷⁻²⁵

In order to apply nutrition and physical activity knowledge for prevention, trainees must possess a framework for understanding these behaviors, as well as a strategy for providing interventions. Empirical evidence from clinical trials based on theories of behavior change, such as the Provider Based Assessment and Counseling for Exercise²⁶ and the Worcester Area Trial for Counseling in Hyperlipidemia²⁷, demonstrated that physicians in practice can improve counseling skills with meaningful patient outcomes. The integrated counseling model used in this intervention incorporated aspects of the patient centered model and the transtheoretical model.¹¹ Our adapted model follows the five A's (ask, assess, advise, assist, arrange) approach adopted by the National Cancer Institute to help physicians counsel their patients in smoking cessation efforts.²⁸

We sought to determine if a combined lecture/standardized patient educational intervention aimed at the predictors and barriers of PAC and NC in practice could improve knowledge, self-confidence in skills, and attitudes of students regarding PAC and NC. Additionally, we wanted to see if students' atti-

tudes regarding the usefulness and effectiveness of counseling varied by specific disease states or behaviors.

Methods

Development of the Educational Module - All students at the University of Louisville participate in Clinical Practice Sciences (CPS), a longitudinal course during the first and second years of medical school covering a wide range of clinical topics. The course integrates the clinical and basic sciences and heavily focuses on both communication and physical diagnosis skills. The physical activity and nutritional counseling activities are taught during the Nutrition and Health Promotion section of the course (two hours of didactic lecture and two 15 minute SP sessions per student for PAC and NC). In the curriculum approach utilized prior to the present intervention, medical students attended lectures on NC and PAC and participated in diet and activity counseling role-play with fellow students. Performance was not assessed and feedback was not provided.

The present educational intervention was introduced in fall of 2002. PAC and NC were introduced to first-year medical students by lecture, supplemented with background materials distributed prior to the classroom didactic. The lecturer presented the counseling model, used videos to demonstrate appropriate techniques, and interacted with students by asking them to identify specific counseling techniques and consider what they would do next in case scenarios. Background materials included descriptions of theories of behavior (the patient-centered model and the transtheoretical model) and how these theories can influence practice. An interview template discussing key points and specific steps to go through during the interview, including scripts to facilitate dealing with common barriers to behavior change and identifying stages of change, was provided. Immediately following the lecture, students were required to use the counseling model in a simulated clinical encounter in which practice and feedback were provided in a low-threat environment.

As previously stated, our integrated counseling model incorporated aspects of the patient centered model, and the transtheoretical model¹¹ and followed the five A's. The introductory lecture was interactive as students were asked to identify stage of change, what the next counseling step would be, and identify inappropriate or omitted counseling techniques.

After the lecture, each student participated in a 15 minute counseling exercise with a standardized patient. In both the nutritional counseling and physical activity counseling sessions a patient presented as a “precontemplator”- a patient who is uninformed about the risk and need for behavior change and uninterested in changing behavior. Students went through the counseling process using the five A’s. After completion of the session students were given feedback by the SP as to what steps were not performed and how their counseling skills could be improved. Students were offered further practice if time allowed.

Participants, Measures, and Procedures - All 147 students in the second year CPS course at the University of Louisville (U of L) were invited to participate in the study. The U of L Humans Subjects Committee approved the research study. Students were asked to voluntarily complete a pretest and a posttest measuring knowledge, attitudes, and confidence in performing physical activity counseling. Participation did not affect a student’s grade unless they failed to participate in the SP exercise that was required of all students. All measures were developed for the present study and we did not collect data on the psychometric properties of the instrument.

Knowledge questions (13 items) were based on content developed by local subject matter experts for the PAC and NC lectures. Questions were reviewed by 4 Internal Medicine faculty and subsequently pretested in a group of 10 residents and 10 4th year medical students. Scores were determined by percent correct with all questions weighted equally. This instrument was used to measure changes in knowledge of NC and PAC concepts following the intervention. The same instrument was used pre and post intervention.

A clinical psychologist with expertise in assess-

ing health-related attitudes and self-efficacy in health of chronically ill persons in a variety of settings assisted in development of the attitude and confidence items. As with the knowledge items, the attitude (six items each for PAC and NC) and confidence measures (seven items for PAC and five for NC) were reviewed by four Internal Medicine faculty and pretested in a group of 10 residents and 10 4th year medical students. Students’ attitudes were assessed by determining their perception of how essential certain disease conditions were to their education and the utility of counseling in the treatment of these diseases. Self-confidence with specific skills for physical activity and nutritional counseling was assessed on a 0-100 scale. The attitude and confidence items measured the effect of the intervention on self-reported confidence in NC and PAC and on attitudes regarding PAC and NC in specific disease states. Examples of these instruments are provided in Figure 1 (Appendix).

The pretest was given at the orientation to the nutrition section of the CPS one week prior to the PAC lecture. The post-test occurred four and six weeks after the NC and PAC lectures, respectively. Students were given extra credit for turning in the posttest, as this occurred after the course ended.

Results

Of 115 students who attended the first lecture, 57 (50%) voluntarily returned both a pre and posttest. Respondents were 60% female and 40% male, approximately the same gender distribution in this medical school class. Pretest and posttest scores for knowledge, attitudes, and confidence are presented in Table 1. Using the Stata statistical software package, pre to posttest changes for knowledge and confidence were examined using paired t-tests and for attitude using the Mann-Whitney-Wilcoxon test. Increased pre to posttest scores were observed for knowledge

Table 1
Pre-Test Post-Test Comparisons of Student Knowledge, Attitudes and Confidence in Counseling

	Pretest	Posttest	Significance
Knowledge	6.1	8.5	P < 0.001
Necessity	6.3	6.2	P = 0.71
Utility	5.8	5.7	P = 0.88
Confidence in Nutrition Counseling	45	78	P < 0.001
Confidence in Exercise Prescription	51	82	P < 0.001

Table 2
Attitudes towards Primarily Counseling vs. Primarily Pharmacological Treated Disease States

	Counseling	Pharmacological	Significance
Necessity	5.9	6.6	P < 0.001
Utility	5.4	6.3	P < 0.001

and perceived self-efficacy for nutrition and exercise prescription counseling, but not in general attitudes regarding necessity of the educational content or the utility of counseling. However, attitudes towards conditions perceived to be treated primarily through counseling (poor nutrition, smoking cessation, inactivity, and weight management) and disease states perceived to be treated primarily pharmacologically (hyperlipidemia, hypertension, and diabetes) were noted and are presented in Table 2. While the overall necessity and utility scores did not change pre/ post-test, differences were found in comparing conditions perceived to be treated primarily through counseling (poor nutrition, smoking cessation, inactivity, and weight management) to disease states perceived to be treated primarily pharmacologically (hyperlipidemia, hypertension, and diabetes). Necessity and utility scores were generally higher for the conditions in the perceived pharmacological treated group.

Discussion

A number of barriers exist for not only for medical schools to provide NC and PAC, but also for physicians in practice to provide these services to their patients. However, despite these barriers, national organizations and trainees feel these are important curricular topics. According to the AAMC 2000 graduation questionnaire, 90 % of students felt physicians could have a greater impact in the areas of disease prevention and health promotion, but believed they were inadequately trained in risk assessment and counseling techniques.¹³ These beliefs are maintained through out residency as 93% of internal medicine residents felt it was their duty to counsel patients but only 28% felt confident of their skills.¹⁵

Using adult learning theory to teach²⁹ a patient-centered/stage of change counseling strategy leads to an increased self-confidence score for physical activity and nutritional counseling skills among first year medical students. SP experiences like the one described in this educational intervention provide the opportunity for students to practice counseling skills in an environment where the threat of embarrassment is low, the skills learned are directly related to clinical

practice, and learning becomes an active process where concepts are generated based upon current and previous experiences and knowledge. Such instructional methods may in the future lead to more self confidence in counseling strategies.

The primary assessment method during the first two years of medical school is knowledge based multiple choice type questions. While knowledge may be necessary to implement a behavior, alone it is insufficient. Furthermore, few studies in the medical education literature assess whether educational methods employed in medical schools improve constructs associated with PAC and NC among practicing physicians.

While knowledge scores increased significantly from pretest to posttest, the relative magnitude of the change was fairly small. Given that SP encounters were designed to provide students feedback on counseling behaviors and not knowledge based questions, the smaller gain in knowledge scores is not unexpected.

Students overwhelmingly agreed that the diseases we surveyed were essential to their education and counseling was useful as a treatment. Utility and necessity scores were not changed as a result of our educational intervention. However, when attitudes regarding disease states treated primarily with counseling were compared to disease states students perceive to be pharmacologically treated, there was a trend towards the pharmacologically treated groups to be viewed as more essential to a student's education and counseling was more useful in the treatment of these patients. It is possible that the students in the present study may have had more negative attitudes toward specific personal behaviors or diseases for which behavior change counseling plays a major role in promoting healthy outcomes, and may then be less likely to attempt to counsel about these behaviors. Future research should be directed at identifying the health-related attitudes of medical students. Should disease-specific discrepancies be evident, educational efforts might then be implemented to help change students' attitudes.

Several factors limit the generalizability of this study. This research occurred at a single institution with a relatively small sample size, and used a convenience sample of respondents. Only half of the medical student class chose to participate in the post-test completion. Results may have been different for the students who did not participate in the follow-up. While large gains in self-confidence were noted, whether the traditional, passive lecture format produces similar results is unknown. In addition, the measures utilized to assess knowledge; self-efficacy, necessity and utility were developed specifically for the present study. Future studies examining their psychometric properties are recommended. Finally, the pre/ post test study design is also a limitation. While we chose this design for simplicity, motivated students may have looked up answers to the knowledge questions and a testing effect is possible. However, we feel the testing effect is less likely for the attitude questions. Further, while maturation is a potential confounder in this study design, no other university sponsored educational activities covered these topics during the study period.

In the future we hope to examine knowledge and confidence in counseling skills among students given either the traditional lecture format or educational methods like the one described. We also plan to further examine our tailored, self-report measures. Finally, we hope to explore whether innovative educational methods lead to changes in physician practice.

References

1. Moore, B.J., Supersized America: Help your patients regain control of their weight. *Cleveland Clinic Journal of Medicine*, 2003. 70(3): p. 237-240.
2. Satcher, D., Progress Review Nutrition. 1998.
3. Prevention, U.S.C.f.D.C.a., Prevalence of sedentary lifestyle-behavioral risk factor surveillance system, United states, 1991. *MMWR*, 1993. 42: p. 576-9.
4. Daily dietary fat and total food- energy intakes --Third National Health and Nutrition Examination Survey, Phase 1, 1988-1991. *MMWR*, 1994. 43(116-117).
5. Kushner, R.F., Barriers to providing nutrition counseling by physicians: a survey of primary care practitioners. *Preventive Medicine*, 1995. 24(546-552).
6. Lewis, C.E., K.B. Wells, and J. Ware, A model for predicting the counseling practices of physicians. *Journal of General Internal Medicine*, 1986. 1: p. 14-19.
7. Lewis, C.E., Disease prevention and health promotion practices of primary care physicians in the United States. *American Journal of Preventive Medicine*, 1988. 4: p. 9S-16S.
8. Lewis, C.E., et al., The counseling practices of internists. *Annals of Internal Medicine*, 1991. 114: p. 54-58.
9. Wechsler, H., et al., The physician's role in health promotion- a survey of primary care practitioners. *New England Journal of Medicine*, 1983. 308(97-100).
10. Glanz, K., Review of nutritional attitudes and counseling practices of primary care physicians. *American Journal of Clinical Nutrition*, 1998. 65(2016S-2019S).
11. Pinto, B.M., M.G. Goldstein, and B.H. Marcus, Activity counseling by primary care physicians. *Preventive Medicine*, 1998. 27: p. 506-513.
12. AAMC Curriculum Directory. 2000, American Association of Medical Colleges: Washington D.C.
13. Garry, J.P., J.J. Diamond, and T.W. Whitley, Physical activity curricula in medical schools. *Academic Medicine*, 2002. 77: p. 818-820.
14. Education, C.o.N.i.M., Nutrition education in US medical schools. 1985, The National Academy of Sciences: Washington D.C.
15. Rogers, L.Q., et al., Teaching resident physicians to provide exercise counseling: A needs assessment. *Academic Medicine*, 2002. 77: p. 841-844.
16. Rogers, C. and H. Freiberg, Freedom to Learn. 1994, Columbus, Ohio: Merrill/ Macmillian.
17. Epstein, R., J. Levenkron, and L. Frarey, Improving physicians' HIV risk-assessment skills using announced and unannounced Standardized Patients. *JGIM*, 2001. 16(3): p. 176-80.
18. Costanza, M.E., et al., The effectiveness of using standardized patients to improve community physician skills in mammography counseling and clinical breast exam. *Prev Med*, 1999. 29(4): p. 241-8.

19. Coyle, B., M. Miller, and K.R. McGowen, Using standardized patients to teach and learn psychotherapy. *Acad Med*, 1998. 73(5): p. 591-2.
20. Lewtas, J., Standardized patients: uses beyond the undergraduate years [editorial; comment]. *J Rheumatol*, 1997. 24(10): p. 1866-7.
21. Hampl, J., et al., Using Standardized Patients to train and evaluate dietetics students. *J Am Diet Assoc*, 1999. 99(9): p. 1094-1097.
22. Heaton, C.J., S.V. Watson, and E.A. Alger, Using a standardized patient to teach health appraisal in a problem-based format. *Acad Med*, 1994. 69(5): p. 415-6.
23. McGraw, R.C. and H.M. O'Connor, Standardized patients in the early acquisition of clinical skills. *Med Educ*, 1999. 33(8): p. 572-8.
24. Nagoshi, M., Role of Standardized Patients in medical education. *Hawaii Med J*, 2001. 60(12): p. 323-324.
25. Robins, L.S., et al., Using standardized patients to ensure that clinical learning objectives for the breast examination are met. *Acad Med*, 1997. 72(10 Suppl 1): p. S91-3.
26. Calfas, K.J., et al., Preliminary evaluation of a multicomponent program for nutrition and physical activity change in primary care: PACE for adults. *Prev Med*, 2002. 34(2): p. 153-61.
27. Ockene, I., et al., Effects of a physician delivered nutrition counseling training and an office support program on saturated fat intake, weight and serum lipid measurements in a hyperlipidemic population: Worcester Area Trial for Counseling in Hyperlipidemia (WATCH). *Arch Intern Med*, 1999. 159(7): p. 725-731.
28. Fiore, M., W. Bailey, and S. Cohen, Treating Tobacco Use and Dependence. 2000, U.S. Department of Health and Human Services. Public Health Service: Rockville, MD.
29. Knowles, M., *Andragogy in Action*. 1984, San Francisco: Jossey-Bass.

Correspondence

Pat F. Bass III
Department of Internal Medicine
LSUHSC- Shreveport
1501 King's Highway
PO Box 33932
Shreveport, LA 71130-3932
Phone: 318-675-5856
Fax: 318-675-7176
E-mail pbassi@lsuhsc.edu

Figure 1- Pre/ Post-Test Example Item

Case : A 40-year-old attorney presents to a personal trainer wanting to increase his physical activity. He mentions that he would like to run in a marathon next year and wanted to make sure it was ok before training. He is currently on no medication and has no medical problems. He quit smoking and drinking at the end of college. He was on his college rowing team but his only physical activity since college is mowing his lawn which he can do without problem. He has a negative family history.

Knowledge Response Choices

- A. No further workup necessary. Patient may proceed with exercise.
- B. Recommend lipid panel to further evaluate cardiac risk prior to exercise prescription.
- C. Recommend a resting ECG to further evaluate risk
- D. Recommend pulmonary function testing.
- E. Recommend an exercise stress test.
- F. Recommend a complete physical exam prior to initiating physical activity.

Attitude Response Choices

	Not very important; not useful in the treatment of this condition or behavior		Moderately important and useful in the treatment of this condition or behavior		Very important; very useful in the treatment of this condition or behavior		
	1	2	3	4	5	6	7
1. Hypertension	1	2	3	4	5	6	7
2. Poor nutrition	1	2	3	4	5	6	7
3. Diabetes	1	2	3	4	5	6	7
4. Smoking cessation	1	2	3	4	5	6	7
5. Inactivity	1	2	3	4	5	6	7
6. Hypercholesterolemia	1	2	3	4	5	6	7
7. Weight management	1	2	3	4	5	6	7

Confidence Response Choices

Please rate your confidence with the ability to do the following

	No Confidence											Complete Confidence
dence	0	10	20	30	40	50	60	70	80	90	100	
1. Identifying the stage of readiness for change for exercise in a patient.												
2. Recognizing contraindications to exercise in a patient.												
3. Counseling patients regarding the benefits of exercise in a patient.												
4. Identifying barriers to physical activity in a patient.												
5. Generating possible solutions to patient's perceived barriers to activity.												
6. Discussing solutions to barriers with a patient.												
7. Providing a patient with an exercise prescription												