

Impact of the Basic Skin Cancer Triage Curriculum on Providers' Skin Cancer Control Practices

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OBJECTIVE: To evaluate the effect of a 2-hour, multicomponent educational intervention on provider skin cancer control practices.

DESIGN: Nonrandomized intervention study. The intervention was a 2-hour curriculum designed to augment provider skin cancer control practices through instruction in basic skin cancer triage (BSCT) and a brief summary of skin cancer epidemiology, prevention, and counseling.

SETTING: Staff-model health maintenance organization in southeastern New England.

PARTICIPANTS: Convenience sample of primary care providers. Providers older than age 75, individuals in practice for less than 1 year, or individuals planning to retire in the next 2 years were excluded from the study. Twenty-two of 28 participants completed the study.

RESULTS: Providers completed preintervention and post-intervention surveys asking them to rate their attitudes towards skin examination and skin cancer counseling and to rate the frequency of their skin cancer control practices, using 5-point Likert scales. We independently assessed provider behavior through surveys of their patients, eliciting information on provider practices before and after BSCT participation. Following participation in the curriculum, there was significant improvement in provider attitudes towards the total body skin examination but not towards skin cancer prevention counseling. Significant increases in provider self-reported skin cancer control practices during an initial visit with a new patient (2.17 to 3.21, $P < .0001$) and a routine visit with a patient at high risk for melanoma (2.15 to 3.00, $P < .0001$) were demonstrated. Patient exit interviews independently confirmed these changes in practice patterns.

CONCLUSIONS: The study results suggest that the BSCT curriculum may be a useful tool in increasing the practice of skin cancer control measures by primary care providers.

KEY WORDS: skin cancer; education; prevention.
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Melanoma incidence and mortality have increased over the past several decades, making it an important public health issue. Since death from melanoma is preventable through early detection, it is critical that we evaluate and attempt to improve current skin cancer control efforts. Current efforts are, unfortunately, scattered and not uniform.¹ Guidelines regarding the recommendation of the skin examination are either conflicting or nonexistent.^{2,3} Some of this confusion arises from the lack of randomized, controlled trial data on the efficacy of the skin examination. Nonetheless, survival from melanoma is extremely poor at advanced stages and the years of potential life lost is high; therefore, improving existing primary and secondary preventive measures is important. Primary care providers (PCPs) are in a unique position to provide preventive services to a vast majority of the general population. In fact, the U.S. population makes an average of 1.7 visits to a primary care doctor annually.⁴ Thus, it is important that the development of certain skin cancer control measures be tailored to the primary care setting. Skin cancer early detection by PCPs has been limited in the past by low confidence and lack of training.⁵ The Basic Skin Cancer Triage (BSCT) curriculum was developed in light of these issues and has been shown to be effective in improving skin lesion triage skills, and confidence and knowledge concerning skin cancer control efforts (Mikkilineni et al., unpublished data). Although these improvements are encouraging, this 2-hour intervention has not been evaluated to determine if it can bring about consistent, preventive behavior change. We evaluated the impact of BSCT on provider attitudes towards skin cancer control and, more importantly, on clinician practice patterns.

METHODS

The BSCT curriculum was developed through the collaboration of experts from the fields of education, psychiatry, and dermatology, and is described elsewhere (Mikkilineni et al., unpublished data). The guiding principles upon which the intervention was based are similar to those for the development of other successful preventive curricula such as those used in smoking cessation. Chiefly, they involve addressing providers' predisposing attitudes and beliefs, the extent of their knowledge, skills, and resources, and the availability of reinforcing factors, such as supportive colleagues and organizational factors such as the presence of cues and prompts.⁶ The curriculum was designed to increase the ability of PCPs to accurately and confidently triage skin lesions and to counsel patients on

skin cancer issues. Providers participated in a training session that involved 2 hours of instruction. Each participant received a packet containing the lecture outline, the triage algorithm, skin cancer information pamphlets, and review articles. The lecture topics emphasized skin cancer epidemiology (restricted to aspects most relevant to clinical practice), clinical characteristics and diagnosis, and prevention and counseling approaches. Instruction and role-play for patient counseling were also included.

Providers were recruited from a pool of PCPs, including physicians, nurses, and physician assistants, from the internal and family medicine departments of 5 sites of a staff-model health maintenance organization in southeastern New England. Providers older than age 75 and those individuals in practice for less than 1 year or planning to retire in the next 2 years were excluded from the study. Potential provider participants received a letter describing the study design, study objectives, and their role in the study. These candidates were then contacted by telephone to confirm eligibility and invite participation.

Provider attitudes and self-reported skin cancer control practices, including performance of the skin exam and counseling about skin cancer, were evaluated prior to the intervention and in a follow-up survey completed 1 month after the intervention. Attitudes toward the total body skin examination (TBSE) and counseling patients regarding skin cancer prevention were measured by the level of agreement with positive and negative statements about TBSE and counseling on a 1-to-5 Likert scale ("strongly disagree" to "strongly agree"). The practice of skin cancer control behaviors during an initial visit with a new patient and a routine visit with a patient at high risk for melanoma were also evaluated, and providers were asked to rate how frequently they performed various tasks on a 1-to-5 Likert scale ("never" to "almost always").

Provider practices were independently assessed by "exit interviews" conducted by telephone on patients of each of the providers. These interviews ascertained information on the provider's behaviors during a recent office visit. Those interviewed were randomly selected; the pre-intervention and postintervention samples were selected from those who had been seen within the prior week for a routine, nonurgent office visit. The patient exit interview consisted of 40 questions that elicited information from patients about their provider's cancer screening practices and lifestyle recommendations. Specifically, the exit interview elicited data on whether or not the provider assessed skin cancer risk, provided complete skin examination, counseled about skin cancer prevention and screening, and provided skin cancer education materials. Responses were "yes," "no," "don't know," or "refused." Information regarding whether or not their provider conducted TBSE, asked about history of skin cancer, or recommended use of sunscreens, sun avoidance, and sun protection was also elicited. Information on whether or not providers performed other cancer prevention activities, such as asking about tobacco use and recommending mammogram in women or

testicular examination in men, was also assessed. No demographic or risk information on the surveyed patient population was obtained. The patients chosen for the postintervention exit interviews were selected independently of those chosen for preintervention exit interviews.

STATISTICS

Responses to the provider questionnaires were analyzed using paired *t* tests; we tested for the presence of effect modification by age, gender, years in practice, time spent in primary care, and provider specialty using linear regression models. The odds ratios (ORs) calculated from the exit interviews were determined from logistic regression models, where patient responses (yes or no) to whether or not certain activities were performed by their doctors comprised the binary dependent variable. The analysis accounted for the timing of the exit interview (preintervention or postintervention) and included indicator variables for each provider. We provide interquartile ranges in ORs for provider for each item on the exit interview. In order to provide stable estimates of the ORs, we chose only those providers who had at least 10 preintervention and 10 postintervention interviews and report an interquartile range in ORs for those items in which 20% to 80% of the responses were yes.

RESULTS

A total of 22 of 28 PCPs completed both the preintervention and postintervention surveys (79% response rate). Provider attitudes towards provision of TBSE improved significantly, and nonsignificant improvements in their attitudes towards skin cancer prevention counseling were demonstrated. The overall provider agreement with positive statements about TBSE increased from 4.20 to 4.60 ($P < .0001$), and their overall agreement with negative statements about TBSE decreased from 2.38 to 1.79 ($P < .0001$). There were nonsignificant increases in their agreement with positive statements about counseling (from 4.09 to 4.22, $P = .20$), and decreases in their agreement with negative statements about counseling (from 1.99 to 1.82, $P = .10$). Tables 1 and 2 summarize the specific changes in provider-reported attitudes.

Following participation in the BSCT curriculum, providers reported an increase in their practice of skin cancer control measures both during an initial patient visit and routine visits with patients at high risk for skin cancer. During an initial visit, their reported screening and prevention practices increased from 2.10 to 3.22 ($P < .0001$) on the 1-to-5 Likert scale. During routine visits with high-risk patients, there was an increase of 1.72 to 2.40 ($P < .0001$) (Table 3). Positive changes about the manner in which providers discussed skin cancer prevention and performed TBSEs were also noted after the intervention (Table 4). There was no effect modification by any of the provider characteristics on either attitudes or self-reported practices.

Table 1. Provider Attitudes Toward Skin Cancer Early Detection Measures Before and After Basic Skin Cancer Triage (n = 22)

Positive Statements About Early Detection	Score Before Intervention*	Score After Intervention	Mean Change	95% CI	P Value
Overall agreement	4.16	4.56	0.4	0.20 to .55	<.0001
Total body skin exam (TBSE) is effective	4.30	4.70	0.4	0.15 to 0.61	.002
Patients' appreciate efforts to provide TBSE	3.70	4.10	0.4	0.12 to 0.74	.009
Early detection can improve morbidity and mortality	4.50	4.90	0.4	0.10 to 0.60	.02

* On a 1-to-5 Likert scale: 1 = never; 2 = sometimes; 3 = about half; 4 = often; 5 = almost always.

Change in provider behavior was also assessed by the exit interview. There were 285 pre-exit and postexit interviews; therefore, data from 570 patients of 17 (61%) of the original 28 providers was analyzed. The total number of patients interviewed for each provider varied as did the number interviewed before and after for each provider. The number of patients interviewed per provider ranged from 18 to 53. The number of preintervention and postintervention interviews per provider ranged from 7 to 32 and 1 to 26, respectively. The mean number of patients interviewed for each provider was 17.6 preintervention and 16.8 postintervention. The mean time from the provider intervention to the patient exit interview was 2.2 months with a range of 0.23 to 7.4 months.

There were significant changes in whether or not a provider performed TBSE, including examination of the back (OR, 1.6; 95% confidence interval [95% CI], 1.1 to 2.4), the belly (OR, 1.8; 95% CI, 1.2 to 2.6), and the legs (OR, 2.4; 95% CI, 1.5 to 4.0). Questions about sunscreen use, including asking whether or not sunscreen is used, recommending the use of sunscreen, and advising the best way in which sunscreen should be used, were reported by patients to be significantly more common after a provider had participated in BSCT. The odds of the provider counseling about tobacco and asking about a family history of cancer, as reported by patients, were significantly increased. The practice of a variety of behaviors unrelated to skin cancer, such as dietary recommendations, did not change substantially after the intervention. Providers also explained to patients about their personal risk for skin cancer more often following BSCT. There was no effect modification on any provider behaviors with length of time from the intervention to the exit interview. Heterogeneity in the extent of behavior

change existed among providers, but no significant interaction between providers and the magnitude of pre-post changes in practice was demonstrated. There was also no interaction between pre-post changes in practices and time since intervention. Confidentiality issues precluded our ability to analyze the exit interview data with respect to provider characteristics. Table 5 summarizes the exit interview results.

DISCUSSION

This 2-hour, multicomponent educational intervention has previously been reported to successfully improve the skills of PCPs in the diagnosis and triage of skin cancer as well as to increase their knowledge and confidence in skin cancer control efforts (Mikkilineni et al., unpublished data). The current analysis suggests that BSCT is also effective in improving the attitudes of PCPs about the TBSE, and, most importantly, it leads to an increase in skin cancer control practices. The greatest impact on provider attitudes was on decreasing negative opinions about skin cancer early detection practices. A substantial impact on improving positive attitudes towards the skin examination also existed. Research on decision making across a wide range of health behaviors indicates that shifting the relative balance between positive and negative opinions is associated with greater likelihood of subsequent behavior change.⁷ Interestingly, there was little physician-reported improvement in attitudes towards skin cancer counseling. Despite this, the independent assessment of provider behavior revealed significant increases in both primary and secondary prevention. We found postintervention skin cancer control efforts occurred at an increased level in this group of

Table 2. Provider Attitudes Toward Skin Cancer Counseling Before and After Basic Skin Cancer Triage (n = 22)

Positive Statements About Early Detection	Score Before Intervention*	Score After Intervention	Mean Change	95% CI	P Value
Overall agreement	4.09	4.22	0.13	-0.01 to 0.32	.19
Physicians can be effective in helping patients decrease skin cancer risk	4.40	4.60	0.20	-0.04 to 0.50	.10
Patients want counseling about skin cancer prevention	3.60	3.80	0.20	-0.23 to 0.51	.50
Physician advice is one of the best ways of influencing a patients' decision to reduce their risk	4.00	4.20	0.20	-0.11 to 0.48	.20
Physician counseling about skin cancer prevention can save lives	4.30	4.20	-0.10	-0.34 to 0.24	.80

* On a 1-to-5 Likert Scale: 1 = never; 2 = sometimes; 3 = about half; 4 = often; 5 = almost always.

Table 3. Provider Self-Report of Skin Cancer Control Practice Changes Before and After Basic Skin Cancer Triage

Behaviors During a routine Visit with a High-Risk Patient	Score Before Intervention*	Score After Intervention	Mean Change	95% CI	P Value
Overall	2.15	3.00	0.85	0.50 to 1.21	<.0001
Performing a total body skin examination	2.04	2.96	0.92	0.26 to 1.56	.008
Asking about sun protection behavior	2.52	3.61	1.09	0.68 to 1.5	<.0001
Advising and counseling about skin cancer risk	2.61	3.57	0.96	0.46 to 1.45	<.001
Providing resource materials on skin cancer	1.44	1.87	0.43	0.01 to 0.86	.05

* On a 1-to-5 Likert scale: 1 = never, 2 = sometimes, 3 = about half, 4 = often, 5 = almost always.

providers for at least 1 month by self-report and for over 2 months by patient report. Surprisingly, there were also increases in preventive behavior regarding tobacco use but no changes in the provision of other preventive tasks such as dietary advice.

To our knowledge, this is the first study to demonstrate such an increase in provider skin cancer prevention practices following a brief multicomponent intervention. In the United States, Dolan et al. report a randomized, controlled trial that analyzes the effects of a brief educational curriculum on beliefs, knowledge, and behaviors related to skin cancer control among internal medicine house staff and attending physicians.⁸ There were non-significant improvements in the intervention group's attitudes about adequacy of skin cancer identification and triage training and in their risk factor identification scores. In terms of behavior, there was a significant change in the mean proportion of patients per physician stating that they were advised to watch their moles, increasing more among the intervention than control physicians. The authors stated that a more intensive intervention might be necessary for a major effect to be achieved. In New South Wales, Australia, Girgis et al. conducted a study among family practitioners utilizing a more vigorous intervention consisting of 3 sessions incorporating epidemiology, diagnosis, management, and clinical and surgical skills.⁹ They reported significant improvements in physicians' levels of confidence and knowledge in skin cancer control as well as in their diagnosis and management of skin cancer. In terms of behavior change, there was a significant increase only in the number of pathology request forms on which a diagnosis of the specimen was attempted in the intervention group versus control group.

The results of our study, with the significant changes in practice patterns observed following participation in BSCT, may in part be attributable to the characteristics of the curriculum itself. The development of this curriculum was based upon the framework of other successful preventive curricula, such as those used in smoking cessation. It was developed in light of behavioral change theory which provides stage-appropriate information to individuals based on their degree of acceptance of change. It was focused on triage and counseling skills without additional details that would contribute useful information, but would also distract from this goal. Also the study population consisted of PCPs from a variety of medical backgrounds including nurses, nurse practitioners, physician assistants, and physicians. This may provide a broader representation of primary care practice and the provision of preventive care in the United States today.

There are a number of limitations of the study. The study was of small sample size. This was a nonrandomized trial; therefore, the behavior changes reported may have been confounded by ongoing secular trends. The study population was comprised of a convenience sample that may have been biased towards early adoption of prevention and early detection practices. In addition, the creators of the curriculum delivered the curriculum so we cannot generalize these results to a curriculum delivered by other educators. Finally, we were unable to ascertain the long-term impact of our intervention.

Skin cancer is a major public health problem. Primary and secondary prevention are essential components of the effort to decrease mortality and morbidity from these malignancies. Unfortunately, past efforts at changing provider behavior have shown that routine practice of skin

Table 4. Provider Self-report of Skin Cancer Control Activities Before and After Basic Skin Cancer Triage Training (n = 22)

Skin Cancer Control Activity	Score Before Intervention	Score After Intervention	Mean Change	95% CI	P Value
Discussing skin cancer control*	2.46	2.96	0.50	0.20 to 0.80	.002
Length of discussion†	2.61	2.96	0.35	0.10 to 0.60	.008
Total body skin examination‡	2.10	3.20	1.10	0.60 to 1.5	<.0001
Providers' personal sunscreen use§	3.36	3.77	0.41	0.03 to 0.80	.04

* 1 indicates no discussion; 2, only if high-risk patient brings up topic; 3, with all high-risk patients; 4, with all patients.

† 1 indicates no discussion; 2, ≤1 minute; 3, 1-2 minutes; 4, 3-5 minutes; 5, >5 minutes.

‡ 1 indicates no total body skin examination; 2, only if high risk patient requests it; 3, only if patient is high risk; 4, all new patients.

§ 1 indicates never; 2, rarely; 3, sometimes; 4, often; 5, always.

Table 5. Changes in Patient-Reported Provider Practices (n = 570)

During your last office visit, did your provider:	Average Odds Ratio (95% CI) Interquartile Range	P Value†
Ask you to fill out a form about your diet?	0.8 (0.2 to 2.9) *	.7
Advise you to reduce dietary fat?	1.18 (0.8 to 1.7) 0.4 to 3.8	.4
Explain how to reduce fat in your diet?	1.3 (0.8 to 2.0) 0.2 to 4.5	.3
Address your concerns/questions about colon cancer?	0.7 (0.4 to 1.3) *	.3
Ask if you used tobacco products?	1.9 (1.3 to 2.7) 0.3 to 10.1	.001
Advise you to avoid or stop using tobacco products?	1.7 (1.11 to 2.7) 0.4 to 8.0	.02
Explain your risk of lung cancer to you?	1.6 (.9 to 2.9) *	.11
Ask if you ever had any cancer?	1.0 (0.7 to 1.4) 0.4 to 1.8	1.0
Ask if an immediate family member ever had any cancer?	1.5 (1.03 to 2.3) 0.4 to 4.6	.04
Talk to you about cancer screening tests?	1.8 (1.04 to 3.1) 0.9 to 2.7	.04
Advise you to have a cancer screening test?	2.10 (1.15 to 3.7) 2.3 to 2.7	.02
Ask if you regularly examine your skin for growths or changes in spots?	2.2 (1.5 to 3.4) 0.6 to 9.4	<.0001
Ask about your family history of melanoma?	1.05 (0.7 to 1.5) 0.3 to 3.8	.77
Ask about your personal history of melanoma?	1.0 (0.7 to 1.4) 0.2 to 1.9	.9
Ask about your history of tanning booth use?	4.8 (1.1 to 21.6) *	.04
Ask if you use sunscreen regularly?	3.8 (2.5 to 5.9) 1.4 to 10.5	<.0001
Ask about your history of bad sunburns?	3.4 (1.8 to 6.6) *	<.0001
Examine the skin on your back?	1.8 (1.2 to 2.5) 0.4 to 4.7	=.003
Examine the skin on your belly?	2.0 (1.4 to 2.9) 1.0 to 4.4	<.0001
Examine the skin on your legs?	2.3 (1.4 to 3.7) 0.6 to 4.0	<.001
Advise you to use sunscreen?	2.8 (1.9 to 4.2) 1.1 to 11.4	<.0001
Advise you how best to use suncreens?	2.7 (1.6 to 4.7) *	<.0001
Advise you to avoid midday sun exposure?	1.7 (1.0 to 2.9) 1.3 to 2.8	.06
Advise you to protect your skin with clothing and hats?	1.6 (1.0 to 2.6) 0.9 to 2.3	.06
Advise you to regularly examine your skin for growths or changes in spots?	1.9 (1.3 to 2.9) 0.6 to 5.1	<.0001
Explain your personal risk of skin cancer to you?	1.7 (1.03 to 2.8) 0.9 to 3.9	.04
Have you fill out a form about sun protection behavior?	2.0 (0.9 to 4.4) *	.09
Talk to you about sun protection?	3.3 (2.12 to 5.10) 1.2 to 13.8	<.0001
Answer your questions about skin cancer prevention?	1.6 (1.02 to 2.4) 0.8 to 7.5	.04
Provide written materials about skin cancer prevention?	0.8 (0.4 to 1.3) *	.4

* Provider level analysis restricted for this item due to insufficient numbers.

† Significant at P < .05.

cancer prevention is difficult to achieve. Despite this, we document that a brief intervention has the potential to change provider behavior. We hope that improved proficiency and increased performance of skin cancer control activities by PCPs will enhance current efforts to reduce skin cancer morbidity and mortality.

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