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Skin Cancer Prevention and Detection Practices in a Michigan Farm Population Following an Educational Intervention

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Patricia B. Mullan, PhD, Joseph C. Gardiner, PhD, Kenneth Rosenman, MD, Zhiwei Zhu, PhD, and G. Marie Swanson, PhD, MPH

ABSTRACT: *Farmers face an increased risk of skin cancer, presumed to be secondary to their increased occupational exposure to sunlight. This study examines skin cancer prevention and detection beliefs and practices among adult farmers in defined control and comparison farming communities in four contiguous counties of Michigan, before and after a community-based educational intervention. The educational intervention included mailing packets containing information on skin cancer risks and community sources for screening, disseminating articles in local newspapers on skin cancer prevention and control measures, and providing information and screening at local county fairs and agricultural community fairs. The responses of 2,999 survey participants were analyzed to identify the interrelationships among their beliefs and their descriptions of their (primary preventive) self-care and professional medical care seeking (for detection and treatment) practices. Factors associated with the likelihood of skin cancer screening and with measures of knowledge and practices associated with medical care of skin cancer were examined. The intervention appeared to improve the practice of preventive behaviors and seeking medical care.*

In an effort to focus the allocation of medical resources on conditions most amenable to prevention, the U.S. Preventive Services Task Force determined that diseases to be targeted must impose a considerable burden of suffering, and methods for their screening and treatment must be effective. The task force identified skin cancer as a condition warranting screening and prevention. But noting how little evidence existed for the efficacy of screening and prevention programs, they limited recommendations for routine screening to populations most at risk for developing skin cancer. The populations identified included people who work outdoors, as well as those exposed to chemical skin carcinogens (U.S. Preventive Services Task Force, 1989).

In its inclusion of skin cancer as a condition meriting systematic prevention and screening, the task force's recommendations concurred with those other medical professional organizations proposed.

For further information, contact: Patricia B. Mullan, PhD, Assistant Professor, OMERAD, College of Human Medicine, East Fee Hall, Michigan State University, East Lansing, MI 48824-1316.

The American Cancer Society, the American Academy of Dermatology, and the 1992 National Institutes of Health Consensus Conference on Early Melanoma identified the prevention and early detection of skin cancer as a prevention policy priority, but their recommendations urged adoption of screening policies that would include the whole population (McDonald, 1993; NIH Consensus Development Panel, 1992).

Policies targeting skin cancer prevention reflect the recognition that skin cancer constitutes the most common form of cancer in the United States (Friedman, Rigel, Silverman, Kopf, & Vossaert, 1991) but, if detected early, holds an 85 to 99 percent cure rate (Rigel, Kopf, & Friedman, 1987). One in six people in the United States will develop skin cancer in their lifetimes; individuals with extremely fair skin face twice the risk (Evans, Kopf, Lew, Rigel, Bart, Friedman, & Rivers, 1988). Two forms of skin cancer, basal and squamous cell carcinoma, spread slowly, and although rarely fatal, can be disfiguring. The third form of skin cancer, melanoma, metastasizes and constitutes the cause of most deaths from skin cancer. Koh notes that the United States has the "dubious distinction of accounting for one third of the melanomas in the world." The incidence of cutaneous melanoma is increasing more rapidly than other forms of cancer (Koh, 1995).

Much of the effort directed to counseling the public to adopt skin protection measures targets recreational exposure, given the popularity of suntanning and having a tan. In farm populations, exposure to the sun can represent an occupational as well as recreational behavior risk. This might represent a more entrenched barrier, given study reports that farmers demonstrate their willingness to engage in personal practices protecting their health but seem less likely to alter routines involving risks directly related to the practice of farming. In *Farming Is In Our Blood*, Rosenblatt (1990) cautions that farm families learn to live with the risks to health that farm work can hold by "learning not to see" the risks they take in their individual practice of the routines of farm work. While acknowledging the risks that farm work poses in general, farmers were less likely to describe these risks as present in the particular farm routines their families practiced.

Other indications of farm populations' reluctance to alter work routines for health concerns includes the finding that they are less likely to take time away from work in response to illness. Analyses of the National Health Interview Survey find that farmers report substantially fewer disability days than any other category of the population. In addition, data from the National Health Interview Survey consistently show that rural populations make fewer physician visits per year than residents of metropolitan sites (Rosenblatt, 1990).

Epidemiological studies confirm that skin cancers occur more often among farmworkers (Monroe, Ricketts, & Savitz, 1992). The caution that farmers seem less likely to perceive and act on risks posed by their farming practices (Rosenblatt, 1990) suggests that skin cancer risks associated with work routines might be more difficult to confront. The relative scarcity of physicians in medically underserved rural areas might pose further difficulties in establishing and increasing appropriate medical screening for skin cancer in rural settings. But documentation that farmers' skin cancer is diagnosed at later stages and meets with less favorable outcomes (Liff, 1991; Osborne, 1990) attests to the urgency of ameliorating these conditions.

This study examines the skin cancer prevention and detection beliefs and practices of adult farmers in three contiguous farming counties of Michigan before and after an educational intervention. Findings were compared to those obtained in a control county. This article explores factors related to farmers' use of skin cancer prevention and screening behavior, and the effect of an educational intervention on farmers' knowledge and attitudes toward skin cancer, their use of personal prevention behavior, and their planned and self-reported participation in medical screening.

Methods

Setting. This research was undertaken as a component of a National Institute of Occupational Safety and Health (NIOSH) supported community demonstration project, intended to examine the use of and factors associated with participation in cancer prevention and screening practices among adults in defined farm populations. The study included the development and dissemination of a multicomponent educational intervention on breast and skin cancer to farm households in three contiguous rural counties in Michigan. A fourth county, which did not receive the educational intervention, served as a control community. These communities (target and control communities) share farming as a dominant occupation, with 60 to 70 percent of the total acreage classified as

farmland, and a designation as medically underserved areas according to criteria established by the U.S. Public Health Service Act Sections 330 and 332.

Study Design and Survey Instruments. The overall study design and description of the survey instruments have been described elsewhere (Rosenman, Gardiner, Swanson, Mullan, & Zhu, 1995) and are reviewed briefly here. A survey instrument was designed to elicit data regarding the experience, knowledge, and attitudes of men and women farmers before and after the implementation of multicomponent educational community interventions aimed at increasing the appropriate use of cancer prevention and screening practices. Respondents also were asked to report their use of specified screening and prevention practices.

The questionnaire was pre-tested with 57 farm men and 61 farm women attending a 1991 annual Farm Bureau meeting within the state. Changes were made to the questionnaire based on responses obtained from the pilot-test administration. A baseline assessment of adult farmers was conducted as a mailed survey in February and March 1992. The project's design included administering the follow-up survey in February through March 1993, one year after the baseline assessment.

The Michigan Farm Bureau provided a list of households from which a random sample was selected to receive the study survey. The membership of the Michigan Farm Bureau, a major trade organization for farmers in Michigan, includes more than 90 percent of the farms in the four-county study area. In this study, the three intervention counties are treated as a single intervention community. Both the baseline survey, sent to 1,250 households, and the follow-up survey, sent to 1,500 farm households, were divided equally between the intervention and control communities. Each household received two questionnaires, one directed to a male adult and one to a female adult occupant. The study protocol accepted completed questionnaires from adult occupants of farm households, whether or not both a male and female adult forwarded completed responses. By prior selection of the demographic characteristics of households, individual subjects were expected to be at least 40 years of age. Respondents were instructed to complete their questionnaires independently.

The sampling strategy stratified each community on the basis of whether the households had been selected to participate in the first survey, regardless of whether or not they had completed the initial questionnaire. Households were selected from those in the intervention and control communities initially surveyed and not surveyed, proportionate to their sizes. This strategy meant that a larger proportion of households that had not participated in the baseline survey would be included in the second survey. This provided a means for discerning the diffusion of the study intervention throughout the community, as well as minimizing the extent to which the study outcomes might reflect the potential impact of the survey itself acting as an intervention.

Intervention. Project development and dissemination strategies were planned with regional and community advisory boards. The educational intervention, initiated at the completion of the baseline survey, included several components. Health care professionals in the region were contacted and received a series of newsletters about the project. Television, radio, and newspaper promotions alerted the intervention community to the introduction of the Farm Cancer Control Project.

A series of articles on skin cancer prevention and screening, emphasizing implications for farm families in the region, was developed and published in local newspapers throughout the region. Information and screening booths were established at county fairs and at agricultural community fairs. At these fairs, a family physician, public health nurse, and local American Cancer Society (ACS) staff disseminated sunscreen lotion and protective caps, as well as ACS guidelines on skin cancer prevention and screening in the form of brochures, calendars, and magnets. A half-day continuing medical education program on skin cancer screening was developed and conducted for physicians in the intervention counties, but only five of the intervention area's 100 physicians attended the CME program. Proposals were elicited from regional nurse practitioners, offering to support their training in screening for breast and skin cancers. From these proposals, five nurse practitioners were selected to receive advanced training in screening for breast and skin cancers at the M.D. Anderson Cancer Center in Houston, TX. The criterion for selection was the nurses' and their clinical institutions' documentation of ability and intent to provide screening in their regions.

A 20-minute videotape was developed and produced, with accompanying training guide and educational print material for distribution. The videotape, featuring interviews with oncologists, family physicians, and adult farmers and their families in the intervention community, presented breast and

skin cancer control information. The videotape was presented to and evaluated by farm groups in the intervention county.

Although the project focused on cancer control behaviors of adult farmers, a school-based intervention also was conducted, in which grade schools in the intervention counties received skin cancer prevention information for dissemination to students. The school-based intervention reflected a response to the request of the community advisory board members, who concurred that skin cancer control efforts should occur in their communities, but asked that children be included in the efforts. Eighth-grade students in 11 schools in the intervention counties were invited to participate in a contest in which the students submitted T-shirt designs featuring skin cancer prevention messages. The local media agreed to present stories about the contest, including photographs of the entire classes of students wearing the long-sleeved T-shirts featuring the winning designs. Teachers in the participating schools also received further skin cancer prevention and detection educational material and mugs with the project's logo.

Individual mailings were sent to 5,997 farm households. The mailings included educational material, summarizing the breast and skin cancer control articles developed for and published in local newspapers, a calendar containing health promotion messages, a refrigerator magnet bearing the project's logo and skin cancer prevention and screening reminders, and a sunscreen sample.

Statistical Methods. The study's outcome measures included the proportion of respondents who reported that they had undergone a medical examination of their skin in the past 12 months. The association of this outcome was tested across variables examined in studies of other populations' use of prevention and screening measures, including respondents' gender, age, education, income, and history of skin cancer. Univariate analyses, calculated to determine potentially significant differences between the study and intervention communities on the distribution of defined sociodemographic and medical variables, excluded missing data items. These farmers also gave information about their concern about their exposure to pesticides and how likely they were to protect their skin from such exposure.

The influence of these independent variables on the study outcome measure was tested, using logistic regression to compute odds ratios for screening in the year prior to each survey. Multiple logistic regression was used to assess the independent association of these factors on the study outcomes.

In addition to medical examination of the skin, two other outcome measures were formed and examined: the first analytic measure considers respondents' skin cancer prevention self-care behaviors; the second, respondents' skin cancer medical care seeking intentions. The self-care prevention score was formed from respondents' descriptions of their likelihood of practicing three skin cancer prevention behaviors: wearing protecting clothing, such as a wide-brimmed hat or long-sleeved shirt; avoiding the sun by staying in the shade; and using a sunscreen or sunblock. The choices of responses to each question were "very likely," "somewhat likely," or "unlikely," which were scored one, two, and three points, respectively. The self-care score could then range from 3 to 9. A medical seeking score was calculated from the respondents' answers to four questions. The first three questions contributing to this score presented the following symptoms: a mole that had changed color or grown in size; bleeding or itching of a mole, freckle, wart, or birthmark; and a small red or scaly patch on the skin that did not heal. For each symptom, response options included "call and make a doctor appointment," "wait until your next regularly scheduled appointment," or "wait to see if it gets better or pain increases." These response options received one, two, or three points, respectively. The last question included in this score asked respondents to indicate their belief that early detection of skin cancer "increased," had "no change," or "decreased" the chances of being cured. The potential range of medical care seeking scores was 4 through 12, with lower scores representing more favorable outcomes.

For the calculation of both the self-care and medical care seeking scores, nonrespondents to any question contributing to the aggregate index were excluded in analyses. To assess the influence of the intervention on the self-care and medical care seeking indices, scores were dichotomized and compared as either representing values more favorable than the baseline's median or representing values as or less favorable than the baseline's median. The influence of participants' characteristics on the self-care and medical care seeing scores was assessed with logistic regression analysis, with values more favorable than the median at baseline as the dependent variable.

The effects of the intervention were assessed in terms of the change discerned in the outcomes and the two (self- and medical care seeking) aggregate scores. These changes were identified for each

Table 1. Characteristics of Participants in the Baseline Survey.

Characteristic	Intervention Communities (n=677) Number (Percent)		Control Community (n=633) Number (Percent)		*P* Value for X^2 Test	
	Male	Female	Male	Female	Male	Female
Gender	336 (49.6)	341 (50.4)	310 (49.0)	323 (51.0)	0.81	
Age Groups						
40-49 years	63 (18.8)	58 (17.0)	62 (20.0)	62 (19.2)	0.28	0.70
50-64 years	117 (34.8)	123 (36.1)	127 (41.0)	116 (35.9)		
65-74 years	88 (26.2)	82 (24.0)	69 (22.3)	82 (25.4)		
75 years or older	68 (20.2)	78 (22.9)	52 (16.8)	63 (19.5)		
Highest Education Level						
Less than high school	113 (33.6)	97 (28.4)	53 (17.1)	40 (12.4)	0.001	0.001
High school/GED	160 (47.6)	162 (47.5)	163 (52.6)	166 (51.4)		
More than high school	62 (18.5)	78 (22.9)	93 (30.0)	112 (34.7)		
Did not respond	1 (0.3)	4 (1.2)	1 (0.3)	5 (1.5)		
Net Annual Income						
Less than $25,000	162 (48.2)	174 (51.0)	114 (36.8)	139 (43.0)	0.005	0.14
$25,000-$50,000	127 (37.8)	114 (33.4)	124 (40.0)	119 (36.8)		
More than $50,000	32 (9.5)	26 (7.6)	50 (16.1)	33 (10.2)		
Did not respond	15 (4.5)	27 (7.9)	22 (7.1)	32 (9.9)		
History of Skin Cancer						
Yes	39 (11.6)	18 (5.3)	41 (13.2)	15 (4.6)	0.59	0.92
No	269 (80.1)	267 (78.3)	238 (76.8)	253 (78.3)		
Did not respond	28 (8.3)	56 (16.4)	31 (10.0)	55 (17.0)		
Skin Screening						
With past year	45 (13.4)	36 (10.6)	47 (15.2)	43 (13.3)	0.59	0.29
Within past three years	80 (23.8)	62 (18.2)	71 (22.9)	71 (22.0)	0.75	0.22
In lifetime	95 (28.3)	80 (23.5)	88 (28.4)	86 (26.6)	0.92	0.30

Note: *P* values computed by *chi*-square testing after deleting the "did not respond" category, with the exception of "history of skin cancer." For "skin screening," missing data were excluded.

dependent variable by comparing the difference in proportions seen at baseline in the intervention and control communities to the corresponding difference between communities found in the follow-up survey. To identify the impact of independent variables on the dependent variables at each survey, the logit of the probability of each dependent variable on the covariates was regressed. These comparisons of baseline and intervention communities consistently tested common sets of variables. Covariates examined in these analyses included age, highest educational level, household income, gender, and history of skin cancer. In addition, the role of the respondent's community (i.e., intervention or control) was considered.

Results

The overall response rate for the baseline survey was 64 percent, for the follow-up survey, 71 percent. Analyses are based on the survey responses of a total of 2,999 residents, with 1,310 responding to the baseline and 1,689 to the follow-up mailed survey. Of the total 2,999 responses, 24 percent (n=711) represented completed questionnaires from households from which only one adult had forwarded a response. To examine the potential that the sampling strategy of mailing to households rather than to individuals might give rise to a correlation between

Table 2. Characteristics of Participants in the Follow-up Survey.

	Intervention Communities (n=878) Number (Percent)		Control Community (n=811) Number (Percent)		*P* Value for X^2 Test	
	Male	Female	Male	Female	Male	Female
Gender	417 (47.5)	461 (52.5)	391 (48.2)	420 (51.8)	0.77	
Age Groups						
40-49 years	92 (22.1)	83 (18.0)	87 (22.3)	88 (21.0)	0.10	0.70
50-64 years	136 (32.6)	159 (34.5)	155 (39.6)	152 (36.2)		
65-74 years	118 (28.3)	122 (26.5)	85 (21.7)	111 (26.4)		
75 years or older	71 (17.0)	97 (21.0)	64 (16.4)	69 (16.4)		
Highest Education Level						
Less than high school	128 (30.7)	121 (26.3)	74 (18.9)	56 (13.3)	0.001	0.001
High school/GED	200 (48.0)	204 (44.3)	199 (50.9)	222 (52.9)		
More than high school	80 (19.2)	122 (26.5)	109 (27.9)	130 (31.0)		
Did not respond	9 (2.2)	14 (3.0)	9 (2.3)	12 (2.9)		
Acreage Farmed						
Less than 1,500	370 (88.7)	371 (80.5)	353 (90.3)	353 (84.1)	*	
1,500-2,500	12 (2.9)	11 (2.4)	7 (1.8)	7 (1.7)		
More than 2,500	5 (1.2)	4 (0.9)	2 (0.5)	3 (0.7)		
Did not respond	30 (7.2)	75 (16.3)	29 (7.4)	57 (13.6)		
History of Skin Cancer						
Yes	34 (8.2)	23 (5.0)	45 (11.5)	22 (5.2)	0.27	0.64
No	348 (83.5)	362 (78.5)	313 (80.1)	319 (76.0)		
Did not respond	35 (8.4)	76 (16.5)	33 (8.4)	79 (18.8)		
Skin Screening						
Within past year	57 (13.7)	44 (9.5)	54 (13.8)	52 (12.4)	0.99	0.15
Within past three years	84 (20.1)	81 (17.8)	90 (23.0)	84 (20.0)	0.39	0.31
In lifetime	108 (25.9)	114 (24.7)	116 (29.7)	115 (27.4)	0.29	0.31

* *P* value not computed because of small cell counts.

Note: *P* values computed by *chi*-square testing after deleting the "did not respond" category, with the exception of "history of skin cancer." For "skin screening," missing data were excluded.

the responses of male and female respondents, correlations were calculated for the defined outcomes. Given that no significant correlations emerged, the data were analyzed using a straightforward logistic model treating gender as a covariate, rather than using a correlated binary regression model for the man and woman within a household. Another alternative, conditional logistic regression also was examined, in which the male-female respondents were considered a 1:1 matched pair. Whenever comparable, the two approaches gave similar results.

Table 1 presents the profile of the 1,310 participants in the baseline survey. As indicated in Table 1, the participants from the intervention communities were comparable to those in the control communities in terms of gender, age, and income. The respondents from the intervention and control communities differed, however, with respect to highest level of education attained and net annual income. Compared to the intervention community, more respondents in the control community had completed at least a high school level of education and received higher levels

of income. As indicated in Table 1, approximately twice as many men as women in both the intervention and control communities reported having a history of skin cancer. Within each community, more men than women reported having a skin screening within the past year. Most of the participants reported they had undergone a skin screening within their lifetimes. Approximately 25 percent of the women and 28 percent of the men said they had never been screened. There were no significant differences in the skin screening reported by the intervention community respondents compared to the control community at the time of the baseline survey.

Profiles of participants in the follow-up survey, shown in Table 2, are comparable to those reported by respondents in the baseline survey. The finding that more respondents in the intervention counties, compared to those in the control counties, had completed less than a high school education emerged in the follow-up survey, as it had in the baseline assessment.

Most of the respondents (98% of participants in the baseline and 97% of participants in the follow-up survey) indicated that they had medical insurance. The association of insurance status (categorized as respondents' descriptions that skin examinations were covered in the presence of symptoms, were covered routinely, were not covered, or the respondent didn't know if skin cancer examinations were covered) was not associated with the outcome of undergoing a medical examination of the skin in the past year in the baseline assessment, either in the control (X^2=5.4, P=0.14, 3 *df*) or intervention communities (X^2=2.0, P=0.57, 3 *df*), or at the follow-up assessment, either in the control (X^2=4.2, P=0.24, 3 *df*) or intervention communities (X^2=0.91, P=0.82, 3 *df*).

In this study, farmers who indicated they were exposed during their farm work to substances harmful to the skin were more likely to wear protective gear (X^2=131.8, P<0.000, 6 *df*). This recognition of risk and readiness to engage in appropriate preventive behaviors to control this exposure also was associated with the participants' undergoing medical skin screening.

Odds ratios were calculated, examining the direction and strength of the association between defined sociodemographic and medical history variables with the respondents' reports that they had undergone skin screening in the last year. Adjusted odds ratio analyses included as variables to be tested for their independent contribution to study outcomes the variables of community (intervention or control) and variables that had emerged as statistically significant in univariate analyses.

Results of logistic regression analyses of income, insurance, and farming as the family's principle source of income were not significantly associated with the report of undergoing a skin examination in the past year. In these analyses, a history of skin cancer, age, and gender were significantly associated with screening. Of the variables associated with screening in the previous year, history of skin cancer elicited the highest odds ratio greater than one. The affect of education was inconsistent. Persons with less than a high school education were more likely to have been screened than those with a high school education. In the baseline assessment, respondents' community (intervention or control) was not associated with screening.

Results of odds ratio analyses, calculated on the responses reported during the follow-up survey, again examining the association of age, education, gender, history of skin cancer, and community of residence with the respondents' report of screening in the past year, found that, as in the baseline assessment, history of skin cancer, age, and gender were associated with screening in the last year. Associations with age and skin cancer screening were less consistent. Unlike the baseline assessment, in which screening was more likely to increase among older respondents, at the follow-up survey, respondents in the 64 to 75 years of age group were more likely to report screening than respondents older than 75 years. In the follow-up assessment, residence in the intervention county emerged as a variable positively associated with respondents' reported skin screening within the last year. The magnitude of the association of both community and gender with screening in the past year, however, was not statistically significant.

Table 3 illustrates the results of logistic regression analyses, comparing baseline and follow-up survey responses, predicting to self-care scores. These analyses are based on the responses of the participants who provided all data required. Of the 1,300 participants in the baseline survey, 1,277 included complete data for these analyses; 1,624 of the 1,689 respondents in the follow-up analyses were included in the self-care score analyses. The distribution of self-care scores was not significantly different in the intervention and control communities in either the baseline survey (P=0.32, 6 *df*) or the follow-up survey (P=0.17, 6 *df*). The dependent outcome variable was an aggregate self-care score less than or equal to the median score at baseline (i.e., a score of 6 or less) versus a self-care score greater than the baseline median score (i.e., a score greater than 6). These

Table 3. Association of Variables with Self-care and Medical Care Seeking Scores.

	Self-care Scores				Medical Care Seeking Scores			
	Baseline Survey Adjusted		Follow-up Survey Adjusted		Baseline Survey Adjusted		Follow-up Survey Adjusted	
Variable	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Age (Ref. 40-49 years)								
50-64 years	1.48	(1.05-2.09)	1.23	(0.91-1.66)	1.19	(0.84-1.67)	1.54	(1.13-2.09)
65-74 years	1.70	(1.15-2.52)	1.68	(1.19-2.36)	1.58	(1.06-2.36)	1.47	(1.03-2.10)
75 years and older	2.35	(1.50-3.68)	1.64	(1.10-2.45)	1.05	(0.67-1.63)	0.78	(0.52-1.17)
Highest Education Level (Ref. Less than high school)								
High school/GED	0.83	(0.59-1.16)	0.84	(0.62-1.14)	1.19	(0.85-1.67)	1.22	(0.89-1.66)
More than high school	0.81	(0.55-1.19)	1.00	(0.71-1.42)	1.38	(0.93-2.03)	1.16	(0.81-1.67)
History of Skin Cancer (Ref. No)								
Yes	2.34	(1.48-3.69)	2.54	(1.67-3.88)	1.63	(1.02-2.62)	1.30	(0.84-2.03)
Gender (Ref. female)								
Male	0.29	(0.22-0.38)	0.41	(0.33-0.51)	0.53	(0.41-0.68)	0.58	(0.46-0.73)
Community (Ref. control)								
Intervention	1.19	(0.92-1.53)	1.28	(1.03-1.60)	1.25	(0.97-1.62)	1.12	(0.89-1.41)

Note: OR indicates odds ratio; CI indicates confidence interval.

analyses show that history of skin cancer and gender are significantly associated with the respondents' practice of sun-protection behaviors. In these analyses, residence in the intervention counties in the follow-up (but not the baseline) survey was positively and significantly associated with more positive self-care scores.

Table 3 also displays the results of logistic regression analyses, comparing baseline and follow-up survey responses, predicting medical care seeking practices and beliefs. The analyses were based on all responses provided by individuals who had answered all four of the items forming this score. This meant that 1,269 of the 1,300 baseline survey participants' and 1,621 of the 1,689 follow-up survey participants' responses were examined. These analyses showed that history of skin cancer, gender, and age were significantly associated with the respondents practice of appropriate medical care seeking practices and belief in the efficacy of early detection on health outcomes. In these analyses, residence in the intervention counties was associated, although not at a statistically significant level, with more positive medical-care seeking practices and beliefs in both the baseline and follow-up surveys.

Discussion

This study elicited farmers' reports of their practice of and factors affecting skin cancer prevention and detection. The adult farmers who participated represent a population at risk for skin cancer that should undergo medical screening for skin cancer. Most of the study respondents indicated that their skin had been examined; but, most often, more than three years had elapsed since the skin examinations. This was true for the majority of men and women in both the intervention and control communities. This find-ing emerged before and after the community-based intervention.

Variables consistently associated with skin screening included gender and age. The finding that men more often reported that their skin had been examined during the past year was consistent with men's twofold greater likelihood of receiving a diagnosis of skin cancer. Older farmers, as a fairly consistent trend, were more likely to report that they had a skin examination within the past year. Clearly, personal history of skin cancer constituted the most powerful predictor of a skin examination within the past year.

The intervention appeared to improve prevention behavior and medical care seeking. Both the personal prevention behavior and the intent to seek medical care indexes were positively associated with the respondents' reports of having their skin examined within the previous year. This finding offers encouragement that this type of study intervention might continue to increase the screening behaviors practiced in the farm communities. Given the limited duration of time between the completion of the intervention and the administration of the follow-up survey's elicitation of respondents' screening behavior in the past year, the current study is limited in making this determination. The study's intervention, then, seems to have been more successful in encouraging farmers' adoption of personal preventive practices and readiness to seek medical care than in increasing screening in the community.

Summary

Because exposure to ultraviolet light is implicated in skin cancer development, cancer prevention programs have focused on sun protection practices. The U.S. Preventive Services Task Force, at the time it formulated its recommendations, emphasized that the prevalence of skin cancer and the evidence of sun exposure as a risk factor for the development of skin cancer warranted the targeting of skin cancer for screening and prevention for persons with increased occupational exposure to sunlight. But the task force cautioned that the general public seemed resistant to adopting skin cancer screening and primary prevention behaviors.

Since the formulation of the guidelines, evidence has accrued that offers potential support for more aggressive screening policies. Indications of the efficacy of focused screening programs includes findings from the follow-up of patients examined in the American Association of Dermatology's free skin cancer screening program. In comparison to the National Cancer Institute's Surveillance Epidemiological and End Results, melanomas found in the dermatology screening program represented earlier stages of disease (Koh, 1995). In addition, studies of family members of patients diagnosed with melanoma suggest that more aggressive screening of family members, following the diagnosis of melanoma within the family, meant that earlier stages of melanoma were detected (Masri, Clark, Guerry, Halpern, Thompson, Elder, & Guerry, 1990; Geller, Koh, Miller, Mercer, & Lew, 1992).

In this study, respondents with a personal history of skin cancer were eight times more likely to have undergone a skin cancer screening within the past year. In the precedent provided by the work of the American Association of Dermatology's screening programs, which target family members of those diagnosed with skin cancer, family members of those with skin cancer complied with programs of more frequent skin cancer screening, and these screening programs achieved better medical outcomes for participants. These outcomes suggest more extensive skin cancer screening policies might be warranted.

These findings lend encouraging support for the premise that community-based educational interventions can build on farm families' established routines of personal preventive behaviors and encourage their understanding of and willingness to act on their knowledge of medical care of skin cancer.

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