Barriers to UV Radiation Lip Protection

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An anonymous questionnaire was given to a convenience sample of 253 beachgoers on Galveston, Tex, public beaches during the summer months of 2004 to evaluate use of lip protection against UV radiation (UVR) damage. Beachgoers used significantly less ($P<.0001$) UVR lip protection (47%) than UVR skin protection (78%). Of individuals using UVR skin protection, 100% of those surveyed indicated that they were aware of the risk of skin cancer from UVR exposure, whereas 75% using lip protection were aware of the risk of lip cancer ($P<.0001$). In those using both lip and skin protection, concern about UVR damage to skin was much greater than was concern about damage to the lips (81% vs 61%, $P=.0003$). A significantly higher percentage of women protected their lips from sun exposure than did men (61% vs 20%, $P<.0001$). Ten percent of men expressed concerns about the masculinity of lip block use (ie, that it is perceived as a product used by women), compared with no women ($P=.03$)

The most commonly cited obstacles to UVR lip protection were forgetting to bring or apply products with a sun protection factor, lack of concern about UVR, and bad taste. Comfort issues, appearance issues, and altered food and drink flavor were also found to be obstacles to use. Whereas changing levels of concern about UVR and concerns regarding the masculinity of lip block may be complex issues, taste, comfort, and appearance are all modifiable factors. Research with the goals of improving materials and vehicles used in lip block seems warranted, because this approach could increase the rates of lip protection in the future. Educating the public about accelerated nonchronologic lip aging may be another approach to improving UVR lip protection.

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Lip rejuvenation procedures are frequently requested because of chronologic lip aging and nonchronologic lip aging changes caused by tobacco use and UV radiation (UVR). With chronologic aging, lip wrinkling increases in number and visibility, intercommissural distance increases, and lip height decreases.[1] Smoking more than 20 cigarettes per day reportedly can age facial skin almost 10 years,[2] possibly through enhanced collagen degradation by increased matrix metalloproteinase-1 in the dermis.[3] Chronic UVA exposure damages the dermis through solar elastosis that manifests clinically as

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wrinkling.[4] In in vitro studies, the combination of tobacco smoke extract and UVA exposure on cultured human fibroblasts resulted in higher matrix metalloproteinase-1 mRNA expression than did tobacco smoke or UVA alone, manifesting an additive impact together.[5]

Smoking cessation and UVR lip protection are 2 important recommendations made by cosmetic dermatologists to help patients prevent lip cancer, delay nonchronologic aging changes in the lips and skin, and maximize the benefits of lip rejuvenation procedures. Dermatologic educational initiatives have been highly successful in informing the public of the importance of skin protection from UVR damage, but the benefits of lip protection from UVR have not yet been as widely recognized. A recent study by Busick and colleagues[6] demonstrated less lip protection from UVR than skin protection from UVR in beachgoers. Our current study was designed to identify obstacles to improved lip protection in a similar study population.

METHODS

Following approval of the study protocol by the institutional review board, one of the authors (JRD) began distributing anonymous questionnaires to a convenience sample of beachgoers on Galveston, Tex, public beaches who were at least 18 years of age. Data were gathered for approximately 6 weeks, from July 25 to September 7, 2004, during peak sun hours (10 AM–4 PM) on days with less than 50% cloud coverage.

The first section of the questionnaire gathered personal and social data, including age, gender, Fitzpatrick skin type, tobacco use, and alcohol consumption. This information enabled the analysis of population subsets, including tobacco users versus non–tobacco users, men versus women, and young adults (aged ≤30 years) versus older adults (aged >30 years). These subsets were then evaluated for any significant differences in UVR protection as well as any specific factors contributing to their lack of protection. The remaining sections of the questionnaire contained 4 checklists: 2 for skin protection and 2 for lip protection. Each respondent was asked to complete one checklist for each section based on use or nonuse of UVR protection. A nonuser would fill out a checklist that contained negative statements regarding protection. Data from nonusers were used to create one-way frequency tables that ranked possible obstacles to protection beyond lack of awareness. Those using UVR protection also filled out checklists. These checklists contained positive statements regarding protection that directly contradicted those in the negative checklists, so that if a certain positive statement was rarely cited, it could indicate obstacles or possible problems with UVR protection.

Marginal homogeneity for matched pairs (ie, use of skin protection and lip protection) was assessed using the McNemar test. An association between an outcome (use of skin or lip protection or awareness and concern about the harmful effects of UVR to the lips) and an explanatory factor (gender, age group, or smoking) was assessed using the Pearson chi-square test or the Cochran-Mantel-Haenszel statistic when adjustment for a confounding factor was needed. All tests were assessed at the 0.05 level for significance. Data analysis was conducted using PROC FREQ in the SAS® system, version 8.2.[7]

RESULTS

A total of 234 questionnaires were completed correctly and analyzed fully. These questionnaires included data from 79 men and 155 women and 44 tobacco users and 190 non–tobacco users. Sixty-five percent of those approached for the survey agreed to complete the questionnaire. No demographic data were available to allow a comparison of survey participants with nonresponders. Nineteen of the questionnaires were completed incorrectly and could not be included in the data analysis. Of these 19 questionnaires, 13 of the respondents indicated that they used skin protection with a sun protection factor and 6 indicated that they used lip protection with a sun protection factor.

When lip protection was compared with skin protection, there was a significant difference ($P<.0001$) in rates of UVR skin protection (78%) and UVR lip protection (47%). For those using both skin and lip protection (n=95), significantly more individuals were aware of the harmful effects of UVR to the skin than to the lip (100% vs 75%, $P<.0001$). Also, in the same set of respondents, more individuals were concerned about the harmful effects of UVR on the skin than on the lip (81% vs 61%, $P=.003$).

To look for other possible obstacles beyond the issue of awareness, a one-way frequency table was created to further analyze those who were aware of the risks of UVR but were not using lip protection (70 of 124 [56%]; Table). Results showed that a large number from this group forgot to apply the product (47%). Other common issues cited were lack of concern (34%), bad taste (11%), and uncomfortable feeling (10%). For those using lip protection (n=110), the least commonly cited positive statements were "I know about the risk sunlight plays in lip cancer and I am concerned" (59%), "Lip protection use prevents skin cancer" (60%), and "Lip protection is safe to swallow" (61%). "Lip protection does not have a bad taste" was cited 78% of the time.

When comparisons were made based on gender, it was noted that levels of UVR skin protection were nearly identical in women and men (79% vs 77%, respectively), whereas levels of UVR lip protection were markedly higher in women (61% vs 20%, $P<.0001$). For those not

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Obstacles for Risk-Aware Nonusers of Lip Protection Products (n=70, unless otherwise indicated)

Possible Obstacle	No. (%)
Forgot to use	33 (47.1)
Unconcerned	24 (34.3)
Bad taste	8 (11.4)
Uncomfortable	7 (10.0)
Alters sensation of tobacco	1 (10.0*) (n=10)
Alters sensation of alcohol	4 (9.5) (n=42)
Worsens appearance	4 (5.7)
Alters taste of alcohol	2 (4.8) (n=42)
Alters the flavor of food and drink	3 (4.3)
Not masculine/feminine	3 (4.3)
Unsafe to swallow	2 (2.9)
Don't agree that lip block prevents cancer	2 (2.9)
Too expensive	0 (0.0)
Too warm	0 (0.0)
Alters the flavor of tobacco	0 (0.0*) (n=10)

*One additional respondent from the group of tobacco users not using lip protection (n=22) and unaware of the risks of UV radiation exposure cited these obstacles.

using lip protection (n=124), lack of awareness of the harmful effects of UVR was equal in men and women (43% and 44%, respectively), but men were less concerned about these risks. Of men not using lip protection, 24% were aware of but not concerned about the risks of UVR in regard to the lips, whereas 15% of the women were aware but not concerned (P=.20). When the frequency tables constructed from the lip checklist were examined, the only discrepancy noted between men and women was in regard to the perception that lip block is not a masculine product to use. Ten percent of men cited such issues when questioned about nonuse, compared with 0% of women (P=.03).

Lip and skin protection use was also evaluated on the basis of age, where the sample set was divided into young adults (≤30 years of age) and older adults (>30 years of age). With regard to skin protection, the rate in young adults was slightly lower (75%) than in older adults (80%), but the difference was not significant. Lip protection use among the 2 groups was exactly the same (47%). In lip protection nonusers, the young adults were slightly less aware of the risks of UVR exposure (50% vs 40%). For the nonusers who were aware of the risks, the younger population was more likely to be unconcerned (24% vs 17%). Neither of these differences was statistically significant.

Tobacco users showed the same level of both lip and skin UVR protection as did non–tobacco users. Although not significant, in nonusers of lip protection, those using tobacco showed slightly less awareness (55% vs 41%, P=.25), but as a group, the tobacco users cited lack of concern regarding lip protection less often than did the nonusers (14% vs 21%). In tobacco users not using lip protection (n=22), one respondent reported lip block changed the flavor of tobacco, and 2 reported lip block changed the sensation of using tobacco (Table).

DISCUSSION

In 2005, Busick et al[6] identified lower beachgoer awareness of the cancer risk associated with UVR exposure to the lip compared with that to the skin, and our current study confirms this observation and also provides new insights into some of the explanatory factors that may be involved. This trend held true not only in nonusers of lip protection as expected but also in lip protection users as well. Thus, some people who protect their lips are doing so for cosmetic or comfort reasons rather than for cancer prevention. Were it not for these reasons, the rate of lip protection use would be even lower than the 47% found in this survey.

In this study, men showed especially poor rates of lip protection. This was somewhat surprising since awareness about lip protection was the same in men and women. Why did men lag behind women when it came to lip protection behavior? Men cited slightly less concern on the issue, and among nonusers, men indicated that lip products are perceived as feminine. Considering the high rates of lip cancer in men across the globe, there is a clear need to focus UVR lip protection education efforts toward men.[8] One method to address the perception of lip protection products as feminine may be to associate lip protection behavior with popular outdoor sports or leisure activities in advertisements and public service announcements. Commercial interests have the opportunity to develop specialized lip-protective products marketed to men and to obtain product endorsements from well-known outdoor athletes, sportsmen, and other popular masculine role models. Reminding women about lip cancer is also important. Although it is true that many women are gaining valuable protection through the use of daily cosmetic lipstick,[9] their rate of use in this study (61%) was below their rate of skin protection use (79%).

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Many areas of the world are seeing increasing rates of lip cancer in women.[8-11]

Tobacco use also contributes to nonchronologic aging of the skin. Although some may assume that tobacco users have a generalized low level of concern regarding their health, it is interesting to note that in our study the tobacco users who were not protecting their lips cited low levels of concern less frequently than did non–tobacco users (14% vs 21%). Of tobacco users who were not protecting their lips, one responded that lip block changed the flavor of cigarettes, and 2 others stated that lip block changed the sensation of using tobacco. Reformulation of lip blocks that would appeal to those who continue to use tobacco despite its adverse consequences on health is a possible solution to further decrease UVR lip exposure in this group.

Lack of awareness remains the major obstacle to lip protection at this time. However, it is interesting to consider why so many of those who were already aware of the risk of lip cancer were still not protecting their lips in the setting of naturally damaging UVR conditions (ie, peak subtropical sun hours at the beach in the summer). Of the 124 individuals who were not using lip protection, 70 (56%) of them stated that they were aware of the risk of lip cancer. This is the population for whom the negative checklist was developed. The Table provides insight about the most likely obstacles in this group; 34% indicated that they were not concerned about cancer risk and 47% reported that they forgot to bring or apply lip block with a sun protection factor. Forgetting to apply may be closely tied to lack of concern. In addition to lack of concern, bad taste and comfort issues were also cited at least 10% of the time. On the positive checklists, 78% of those using lip block indicated that it does not have a bad taste, but this positive response rate suggests the possibility that 22% of lip block users think that it does have a bad taste but elect to use it anyway. Bad taste and comfort are modifiable factors, and continued investigation into new materials and manufacturing methods could potentially result in more appealing lip blocks and translate into more widespread use in the future. Research designs used to evaluate oral antibiotic and corticosteroid suspensions for taste palatability and aftertaste could be modified to identify lip block products that may enjoy higher compliance rates.[12]

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