Breaking Barriers: Providing Skin Cancer Education to the Homeless and Uninsured

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Abstract

Background: One in five Americans will develop skin cancer with an even higher rate presumed for the homeless and uninsured patient population. Travis Park Dermatology Clinic (TPDC) is a medical student-run free clinic in San Antonio, Texas that serves the homeless and uninsured patient population.

Objective: The purpose of this study was to investigate the level of knowledge regarding basal cell carcinoma (BCC) and skin cancer prevention in the TPDC patient population and to determine if education can improve patient knowledge, with the hope of preventing future cases of skin cancer.

Methods: Patients at TPDC were surveyed to assess demographics, including age, ethnicity, sun protection behaviors, sun exposure, and occupation. They also completed a "pre-education" quiz to assess their baseline knowledge of BCC. Students then educated patients on identifying BCC and preventative measures and also supplied them with appropriate sunscreen. Afterwards, patients completed the "post-education" quiz, identical to the "pre-education" quiz for purposes of assessing the efficacy of this educational project.

Results: Fifty-seven of these patients (80%) had never heard of BCC. The average time spent outdoors was 2.93 hours per day; however the majority of patients (57%) reported not using any sunscreen. The average pre-education quiz score was 60.1%, and the average post-education quiz score was 70.5%, showing an increase of 10.4% ($p<0.05$).

Conclusion: The results indicate that the TPDC patient population's knowledge of BCC and sun protection increased during the course of the project. Data indicate a need for the continuation of education regarding BCC and its prevention in the homeless and uninsured population of San Antonio.

Background

One in five Americans will develop skin cancer.[1] This statistic is presumed to be even higher for homeless and uninsured populations because these individuals are less likely to have a regular source of care and are more likely to delay or forgo preventative care and screening as a result of cost and lack of access.[2,3,4,5] Furthermore, many of these individuals lack education regarding sun protection and skin cancer prevention despite spending long hours in the sun daily.[6] The population served at Travis Park Dermatology Clinic

(TPDC), a student-run free clinic from University of Texas Health Science Center at San Antonio (UTHSCSA), is no different. For the past three years, data gathered from this clinic have shown that 11% of TPDC patients presenting to this clinic are diagnosed with cancerous or precancerous lesions.

Basal Cell Carcinoma (BCC) is the most common type of skin cancer, comprising 80% of skin cancer diagnoses.[7] BCC's are caused by chronic damage induced from ultraviolet (UV) radiation from the sun.[8] Consequently, BCC's are found in sun-exposed areas, including the face, scalp, neck, chest and shoulders, and back of the arms and hands.[8,9] This begins in the basal cells, which are located in the deepest layer of the epidermis. Untreated, BCCs can progress to affect bone and other local tissue.[7] Metastasis is rare, occurring in only about 0.028% to 0.55% of cases.[8]

Limiting sun exposure and using one ounce of sunscreen, which is SPF 30 or above, water resistant, and broad spectrum, offers protection.[10] Sunscreen should be reapplied every two hours or after sweating or swimming.[11] Those with lighter skin are at an increased risk of developing skin cancer.[12]

BCC's can vary in presentation, typically appearing as a slow growing sore that bleeds easily and does not completely heal. They may have raised borders with a rolled appearance. However, BCC's can also have a bumpy appearance or rough scaling surface. BCC's are often suspected by palpation and visual inspection and confirmed with a biopsy. BCC and its complications are preventable with appropriate sun protection and early detection, respectively. Therefore, patient education about BCC and sunscreen use is very important, especially in populations such as those served at TPDC, as they are at an increased risk for developing skin cancer and having delayed medical care.

The purpose of this study was to investigate the level of knowledge regarding basal cell carcinoma and skin cancer prevention in the TPDC patient population and to determine if education can improve patient knowledge. We hypothesized that by educating patients about BCC and sunscreen use, patient knowledge would improve with respect to BCC presentation, importance of treatment, and sun protection for prevention.

Materials and Methods

TPDC is a clinic staffed by medical students, residents, UTHSCSA faculty and community dermatologists with the mission to treat skin disorders in the uninsured and homeless populations of San Antonio. The clinic is located in Travis Park United Methodist Church. For the past two years, "Breaking Barriers" themed projects have focused on treating and educating the patient population of Travis Park regarding the prevention, identification, and treatment of two of the three most common types of skin cancer: melanoma and squamous cell carcinoma. This year, the focus was basal cell carcinoma.

Seventy-one patients were included in this study, which began in October 2014 and was completed in March 2015. TPDC took place twice per month during which patients of all ages were treated for various dermatologic conditions. Patients completed a pre-education quiz that assessed their pre-existing knowledge of basal cell carcinoma (definition, identification and appearance, risk, and complications) and adequate use of sunscreen (amount, protection, and UV coverage). Additionally, they completed a questionnaire that evaluated their practice of sun protection behaviors (sunscreen use, SPF level, hats, clothing) and demographic information (ethnicity, skin type, occupation, daily sun exposure, living situation).

All uninsured and/or homeless patients of any age seen at TPDC were eligible to participate in the study. Patients were not excluded from the educational component based on positive history of skin cancer; however resolved cases were not used to calculate

the prevalence of skin cancers in the TPDC patient population. Patients were not stratified based on BCC diagnosis or stage because all patients had localized disease at stage II or below (less than two centimeters without spread to any nearby organs or lymph nodes).

Medical students took patient histories and performed dermatologic physical exams. Following patient examination and treatment by medical staff, students reviewed patients' answers to the quiz questions and provided a handout to patients explaining BCC and another handout explaining appropriate selection and use of sunscreen.

Patients then completed a post-education quiz. Results of pre- and post-education quizzes and questionnaires were recorded. Patients were given the education handouts to keep and were encouraged to share their knowledge with family and friends. They were provided with a sample of sunscreen that met American Academy of Dermatology Criteria (AADC).[10]

The pre-education and post-education quiz scores were used to assess the educational component of our project. A paired t-test was performed to compare the change in overall pre- and post-education quiz scores. To identify changes in the proportion of correct and incorrect answers for particular items on the pre- and post-education quizzes, McNemar's exact test was used for the first four questions on the quiz, and McNemar's asymptotic test was used for the fifth question. Responses were categorized as "right" or "wrong." Missing answers were excluded from the analysis. All diagnoses for patients were documented and used to assess the prevalence of various dermatologic conditions in the TPDC patient population. Medical students and faculty determined the appropriate category for the diseases encountered at the clinic.

Results

Among the patients who presented to TPDC from October 2012 to March 2015, 11% were diagnosed with pre-cancerous or cancerous lesions. Other common diagnoses at the clinic included: inflammatory diseases (29%), benign growths (23%), and infectious diseases (14%) (Figure 1). Two presentations of BCC are shown in Figure 2.

At baseline, 80% of patients had not heard of BCC, and 57% of patients reported using no sunscreen (Figure 3). However, the average time spent outside was 2.93 hours per day, and over 60% of patients worked jobs that required them to be outside for two or more hours per day. Forty percent of patients reported having light colored skin, predisposing them to increased risk of sun damage.

BCC quiz results (Table 1) showed that before education, 85% of patients (n=51) knew BCC was the most common type of skin cancer, 88.5% (n=54) knew that it was caused by chronic sun exposure, and 15.5% (n=9) were able to correctly identify a BCC based on description. After education, 98.3% (n=59) knew that BCC was the most common skin cancer ($p<0.05$), 95% (n=57) knew that it was caused by chronic sun exposure ($p>0.05$), and 39% (n=23) were able to correctly identify BCC based on description ($p<0.001$). Before education, 86% (n=49) knew that BCC could

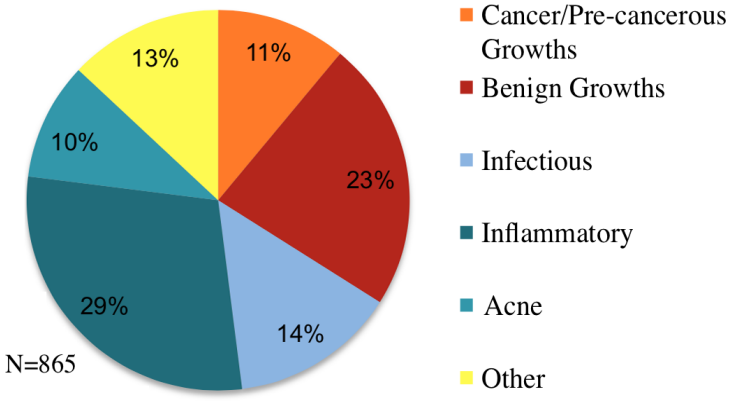

Figure 1. Diagnoses at TPDC (Oct 2012-Mar 2015)

Figure 2. Common Appearances of BCC.
Photos donated by Dr. Mark S. Wallis, M.D. Patients consented to use of these photos in this publication.

spread to nearby bone, and 23.3% (n=14) were able to identify the reccommended criteria for selecting a sunscreen ("using an SPF 30 or above," "using a broad spectrum sunscreen," and "using a water resistant sunscreen"). After education, 88.1% (n=52) knew that BCC could spread to nearby bone, and 59.3% (n=35) were able to identify recommended criteria for how to select a sunscreen ($p<0.001$). This reflects an overall increase of 36% in the number of patients with knowledge of adequate sun protection following education.

The average score of the participants increased 10.4% ($p<0.05$) from 60.1% before education to 70.5% after education. The most commonly missed question (how to identify basal cell carcinoma) improved from only 12.7% of patients answering correctly to 32.4% answering correctly, an increase of 19.7% after education ($p<0.001$).

The incorrect choices can be viewed in Table 1 and are summarized below. Of the incorrect answer choices, 8.3% (n=5) initially thought that BCC was an allergic reaction. No patients thought this after education. Before education, 11.5% (n=7) thought that BCC was caused by something other than sunlight (consumption of artificial sweeteners, being around animals, or staying indoors). After education, 5.1%

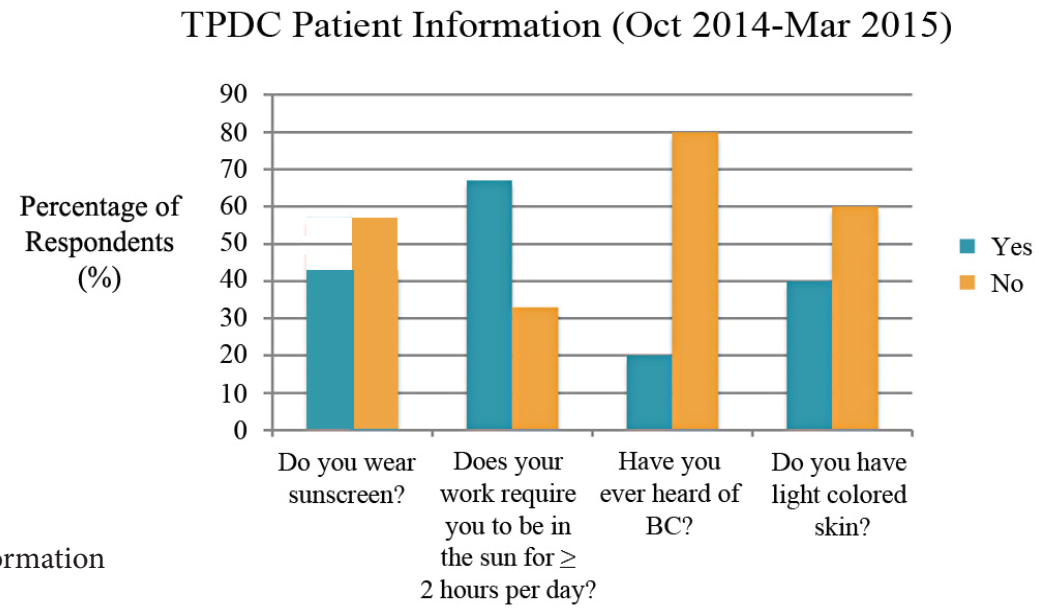

Figure 3. TPDC Patient Information

Table 1. BCC Quiz Results (green indicates correct answer choice)

QUESTION	ANSWER PRE-EDUCATION	ANSWER POST-EDUCATION	P-value
Basal Cell Carcinoma is: a. A virus b. The most common type of skin cancer c. An allergic reaction	(a) 6.7% (b) 85% (c) 8.3% N=60	(a) 1.7% (b) 98.3% (c) 0% N=60	0.016
Basal Cell Carcinoma is caused by: a. Chronic sun exposure b. By consuming artific al sweeteners c. Staying indoors d. Being around animals	(a) 88.5% (b) 4.9% (c) 3.3% (d) 3.3% N=61	(a) 95.0.% (b) 1.7% (c) 1.7% (d) 1.7% N=60	0.453
Basal Cell Carcinoma looks like: a. A pink or brown/black growth that slowly grows, bleeds easily, and may ooze and crust over b. A shiny pink or red scaly patch that may have a flat center and doesn't heal com-pletely c. An itchy collection of bumps along the arms and legs d. A large, uneven, multi-colored mole	(a) and (b) 15.5% (a) 36.2% (b) 19% (c) 3.4% (d) 13.8% Other combinations of the choices: 12.1% N=58	(a) and (b) 39% (a) 16.9% (b) 15.3% (c) 1.7% (d) 3.4% Other combinations of the choices: 23.7% N=59	<0.01
It is important to treat BCC because: a. It is contagious b. It can spread to nearby bone c. You don't have to treat it	(a) 10.5% (b) 86% (c) 3.5% N=57	(a) 8.5% (b) 88.1% (c) 3.4% N=59	0.625
The appropriate use of sunscreen includes: a. Use a sunscreen with SPF 30 or above b. Using a broad spectrum sunscreen c. Using a water resistant sunscreen d. Using a pea-sized amount of sunscreen for the entire body	(a) (b) and (c) 23.3% At least one of the above 71.7% (d) 5% N=60	(a) (b) and (c) 59.3% At least one of the above 39% (d) 1.7% N=59	<0.01
Overall % Correct	60.1%	70.5%	0.013

*Data not available for each question for every participant. Missing answers were not used in this analysis; n=57-61

(n=3) thought that BCC was caused by one of these incorrect choices. Before education, 36.2% (n=21) were able to identify only the first of the two listed descriptions of BCC (answer "A") and 19% (n=11) were able to identify the second of the two listed descriptions (answer "B"), but not both. The other most commonly selected answer prior to education was the description of melanoma (choice "D"). After education, 16.9% (n=10) identified only the first of the two descriptions, and 15.3% (n=9) identified only the second of the two descriptions, but not both, and only 3.4% (n=2) selected the description of melanoma. Before education, 14% (n=8) thought that BCC was either contagious or did not need to be treated. After education, 11.9% (n=7) thought BCC was either contagious or did not need treatment.

Before education, 71.7% (n=43) identified at least one of the three correct AADC criteria (SPF 30 or above, broad spectrum coverage, water resistant), and 5% (n=3) thought that using a pea-sized amount of sunscreen for the entire body alone was correct. After education, 39% (n=23) correctly identified at least one, but not all, of the correct criteria, and 1.7% (n=1) thought that using a pea-sized amount of sunscreen for the entire body alone was correct. The percentage of participants correctly identifying all three criteria increased from 23.3% pre-education to 59.3% post-education ($p<0.001$).

Discussion

The results of this study indicate a statistically significant 10.4% ($p<0.05$) increase in TPDC patient knowledge of BCC based on average scores for the quiz. Regarding sunscreen selection for adequate protection, patient knowledge of criteria increased by 36% ($p<0.001$). This demonstrates that education did increase patient knowledge regarding BCC and sun protection.

The findings of this study emphasize that there remains a lack of education among the population served at TPDC regarding the importance of sun protection to prevent skin cancer, practice of sun protection behaviors, and the most common type of skin cancer. Eighty percent of patients in the TPDC patient population had not heard of BCC, more than half (60%) worked jobs that required them to be in the sun for two or more hours per day (which requires reapplication of sunscreen for adequate protection), 40% reported light colored skin (which predisposes them to increased risk of sun damage and skin cancer), and 57% reported using no sunscreen. Prior to education, only 23.3% of patients knew what criteria to use when selecting a sunscreen for adequate sun protection, and after education, 40.7% of patients still could not correctly identify the AADC criteria ($p<0.001$). These findings demonstrate that despite lifestyles that involve chronic sun exposure (occupation, homelessness), the majority of patients do not practice sun protective behaviors, and there is a large proportion of patients who do not know how to adequately protect themselves.

While 85% were able to correctly identify what BCC was prior to education, 84.5% were unable to identify what it actually looked like, which could contribute to delays in seeking medical care. After education, 39% ($p<0.001$) of patients were able to correctly identify two of the BCC manifestations, and 98.3% ($p<0.05$) were aware that BCC was the most common type of skin cancer. These findings show that our educational intervention was helpful to patients in identifying BCC and understanding that it is indeed cancerous. We also found that after education, 95% of patients correctly answered that BCC was caused by chronic sun exposure, compared to 88.5% of patients prior to education ($p>0.05$); the improvement in patient knowledge regarding the strongest risk factor for BCC (sun exposure) was not statistically significant, indicating that further education regarding BCC risk factor awareness is still needed. Additionally, 57% of patients in this population reported using no sunscreen, and only 39% were able to correctly identify BCC after education ($p<0.001$). These findings demonstrate that there is a continued need to educate the TPDC population regarding skin cancer and prevention.

One limitation of this study was the small number of Spanish speaking volunteers. Prior to the project, a language barrier was hypothesized to be a concern, so educational handouts written in Spanish were created for distribution to Spanish-only speaking patients. However, despite the distribution of these handouts, patient education was still limited as most of the clinic volunteers were English-speaking only, with only minor proficiency in medical Spanish. This communication barrier led to feelings of discomfort during the patient education sessions, and this was a major point addressed by the medical student volunteers. We believe that this communication difficulty played a role in lower post-education quiz scores and incomplete surveys. The requirement to have at least one Spanish-speaking volunteer present at the clinic would help overcome the language barrier. Additionally, lack of literacy could provide a further limitation though it was not present in this study's cohort. In addition to bridging the communication gap between the patients and clinic volunteers, future efforts should be aimed at teaching patients about general skin cancer knowledge, sun protection strategies, and preventive behaviors in order to further increase patient awareness, education, and motivation to protect themselves from skin cancers such as BCC.

Acknowledgements

We are grateful for the support of this project by the Center for Medical Humanities & Ethics and the School of Medicine Alumni Association.

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