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Improving Skin Cancer Knowledge and Prevention Among College Students: A Quality Improvement Project

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Improving Skin Cancer Knowledge and Prevention Among College Students: A Quality Improvement Project

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Abstract

Skin cancer is among the most common diagnosed cancers worldwide, as incidence rates have continued to be on the surge (Compres et al., 2020). Incidents of basal cell carcinoma (BCC), squamous cell carcinoma (SCC), and malignant melanoma (MM) are still increasing. This trend can be counteracted by means of primary and secondary prevention because the main risk factor for skin cancer is ultraviolent (UV) exposure. Thus, early detection of skin cancer can be cured successfully. Despite suggestions of early screening, lack of knowledge and behaviors regarding skin cancer prevention and awareness are still prevalent among the college student population. Clinicians play a critical role in detecting signs of skin cancer and educating their patients. Therefore, it is imperative for the young adult population to understand concepts that can guide them to the identification of skin cancer warning signs. Following the completion of a literature review, thirteen studies were selected. The studies emphasized that skin cancers can be mainly prevented through the proper use of sun-safety measures, regular application of sunscreen, eye protection, and avoiding times of maximum incidence of UV radiation. The literature indicates that the young adult college students have a decreased understanding on skin cancer prevention strategies. Based on the findings of the literature review, a quality improvement (QI) project was conducted at the Florida International University Student Health Center to increase college students' awareness and knowledge to identify and prevent skin cancer. An evidence-based educational intervention was designed and delivered in-person via PowerPoint Presentation. Pre-test and post-test surveys were analyzed using a paired samples t-test. Following the educational intervention, the overall post-test scores improved in both knowledge (pre mean score 7.1, post mean score 8.0) and behaviors (pre mean score 3.9, post mean score 5.0). This QI project supports the notion that educational programs can be an effective strategy to alert patients to the possibility of identifying and preventing skin cancer.

Keywords: skin cancer, college students, knowledge, behaviors, prevention, awareness, education

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Introduction/Problem Statement/Significance

Background

Excessive sun exposure and inadequate protection are the two main risk factors associated with melanoma and non-melanoma skin cancers (Castro-Maqueda et al., 2021). According to the International Agency for Research on Cancer, solar radiation and UV light are classified as Group 1 carcinogens, which may induce basal cell carcinoma and squamous cell carcinoma (Castro-Maqueda et al., 2021). As such, exposure to UV radiation increases an individual's predisposition of developing skin cancer.

The amounts of UV exposure received during childhood and young adulthood increases the risk of skin cancer development. Over the last 30 years, skin cancer prevalence has risen and found to be related to other chronic skin and eye disorders, including: actinic keratosis, pterygium, cataracts, and possibly macular degeneration (Castro-Maqueda et al., 2021). Most of these disorders can be prevented through the proper use of sun-safety measures, regular application of sunscreen, eye protection, and avoiding times of maximum incidence of UV radiation.

Further, Bowers and Moyer (2019) conducted a study that examined self-affirmation interventions to improve receptiveness of information related to skin cancer prevention. The self-affirmation intervention consisted of the participant writing about a value or a physical trait that is important to them based on a list they were given. The participants were female college students who were provided with personalized UV photograph feedback, which identified that areas of the face may be possibly damaged and at risk for developing skin cancer (Bowers & Moyer, 2019). The findings indicated that self-affirmation positively impacted skin cancer risk awareness, although the inclusion of only female participants was a limitation in the study. Additionally, an exploratory study by Woodmansee et al. (2019) showed that nurse practitioner graduate students agreed on the

importance of screening patients for skin cancer and providing full body skin examinations. By utilizing skin cancer screening tools in young adult college students, reinforcement will be made on lifestyle changes, such as decreasing sun exposure, by providing education about UV-induced adverse effects.

Problem Identification

Skin cancer is among the most common diagnosed cancers worldwide, as incidence rates have continued to be on the surge (Compres et al., 2020). The increase is mainly influenced by an aging population and increased sun exposure leading to a longer lifetime with ultraviolent (UV) exposure (Omara et al., 2020). Thus, sun exposure practice, sunburn events, skin type, tanning preferences, annual skin check-ups, and sun protection during outdoor activity should be assessed. The identification of incidental skin cancers among adults may be avoided through routine use of total body skin examination (TBSE) (Omara et al., 2020). According to Omara et al (2020), 44.2% of dermatologists reported that "patient embarrassment" was a barrier to performing TBSE. Targeting young adult patients to increase their knowledge and behaviors towards skin cancer could optimize detection rates of incidental skin lesions and ensure that screening measures are taken.

Scope of The Problem

The three most common skin cancers are: basal cell carcinoma (BCC), squamous cell carcinoma (SCC), and melanoma. BCC and SCC are classified as nonmelanoma skin cancers (Lee & Kang, 2018). Melanoma is a distinctive cancer because it grows fast, and survival rates decline dramatically in individuals that are diagnosed with this type of cancer. According to Lee and Kang (2018), more than 3.5 million people are diagnosed with skin cancer each year. In particular, there has been an increase in incidence rates by 6.1% every year among young white women younger than age of 44 (Lee & Kang, 2018). A study among college students indicated that less than half of the

students (37.9%) had knowledge about skin cancer, which was mostly obtained through the internet (24.5%) and media (24.1%) (Ugurlu et al., 2016). Additionally, 77.3% of the students did not know about screening tests for skin cancer. This may be attributed to the lack of emphasis on education about routine self-checks. Thus, it is important to improve early diagnosis and screening by educating about the signs and symptoms of skin cancer.

Many young adults of all different skin colors have been engaged in "unintended behaviors" such as indoor/outdoor tanning and avoidance of sunscreen use, increasing the possibility of developing skin cancer (Lee & Kang, 2018). Lee and Kang (2018) mentioned that the motivation of both male and female young adults to accept or deny such behaviors depends on how providers emphasize skin protective measures and the types of risks, such as physical health and/or appearance risk. It is important for health care providers to focus on risks of sun exposure, such as early aging of the skin, as the young adult may be more apt to listen since their body image will be affected.

Castro-Maqueda et al. (2021) developed a cross-sectional questionnaire-based study exploring sun exposure and protective practices among college students. Each participant completed a two-page questionnaire on sun exposure and protective practices. The following information was obtained from each participant: sociodemographic variables, number of hours of sun exposure, number of sunburns within the last year, sun protective measures when exposed, use of sunscreen, outdoor exercise hours per day, use of sunscreen and reapplication rate, and personal skin exams and visits to dermatology (Castro-Maqueda et al., 2021). Results indicated that students are exposed to high levels of UV radiation, and a majority of participants were not adequately using protection. Through education on skin cancer and protective practices, self-awareness may increase, and this can lead to decreased skin cancer rates.

Accordingly, avoiding UV rays could prevent over one million people from developing skin cancer per year (Lee & Kang, 2018). In addition, occupational exposures to high degrees of UV radiation or exposure to chemicals during a manufacturing process may increase risk of skin cancer. UV rays are one of the main causes of skin cancer. Young adults may not understand the consequences and serious repercussions of practicing sun safety, since cancer is a long-term effect of sun exposure.

Significance of This Problem

Epidemiological studies indicate an alarming increase in the incidence and occurrence of both melanoma skin cancers and non-melanoma skin cancers, with the incidence of non-melanoma skin cancers being roughly 20 times higher than melanoma cases (Galvez et al., 2020). Skin cancer could lead to tumor evolution of other skin diseases and tumor degeneration, which is when there is malignant tissue growth of a previously existing benign tumor (Galvez et al., 2020). Understanding the consequences of skin cancer is important for developing effective preventative approaches and educating the young adult population on reducing risks.

Many young adults found the initial diagnosis of melanoma distressing and shocking. They had difficulty dealing with the knowledge that their diagnoses could have been prevented at a much earlier stage (Vogel et al., 2017). Not only was the diagnosis difficult to process, but it also had a negative psychological impact, as young adults were required to use caution everyday activities to prevent aggravation of their skin cancer.

Consequences of The Problem

Healthcare costs of skin cancer continue to increase, where the largest portion is from the cost of systemic agents for treating melanoma and total expenditures of $2.5 billion were fees for skin-cancer diagnoses (Kronemyer, 2018). Approximately 49% was from the diagnoses of BCC ($715

million) and SCC ($525 million) (Kronemyer, 2018). As newer systemic agents come to the market, the cost of cancer increases, and this is not calculating out-of-pocket patient drug coverage. Secondary prevention through education and screening are important to decrease healthcare costs related to cancer and to decrease morbidity and mortality in high-risk groups, such as young adults.

Knowledge Gaps

Skin cancer is a underrecognized problem for diverse populations (Linos et al., 2016). There is a lack in secondary preventive efforts for the detection of skin cancers across the literature. The majority of primary care providers do not routinely screen due to lack of training in exam, time constraints, performance confidence, and intention to practice it (Garg et al., 2014). Lack of knowledge about skin cancer screening secondary to lack of training can have detrimental effects on patients. If cancer screening is not done, education for patients about cancer risks may be possibly lacking as well. With a limited patient encounter time, primary care providers and specialists need to prioritize preventive counseling and skin cancer surveillance (Garg et al., 2014). Availability of screening tools in healthcare settings that are easy to use, and that the provider feels comfortable with will help increase skin cancer risk assessments in patients.

Summary of the Literature

A literature search was conducted to assess the clinical problem of skin cancer awareness in young adults of all different skin colors. The databases that were utilized include ScienceDirect, Gale Academic OneFile, Social Sciences Citation Index, CINAHL Plus, and Academic Search Complete. Search terms included: assess, skin cancer, young adults, college students, knowledge, behaviors, screening, screening tool, and prevention. Search limitations included articles published within five years, full text access, and articles written in English. Exclusions included access and abstracts. The search generated a total of 3,924 academic journal articles, and thirteen of those articles were used in

this literature review. The search was narrowed to include articles that targeted the young adult population and analyzed their knowledge, behaviors, and attitudes on sun exposure and skin cancer.

Risk Factors in Young Adults

As young adults in the United States are continuously exposing themselves to large amounts of ultraviolet (UV) radiation, the primary risk factor for the population is chronic sun exposure (Fors et al., 2020). It is key to provide this population with education regarding the long-term effects of sun exposure. The Hunang et al. (2019) study identified risk factors associated with nonmelanoma skin cancer (NMSC) occurrence and survival in young adults. Out of the 124 participants, 44% had a genetic condition, and 10% had a primary skin lesion associated with increased risk for NMSC. The main cause of the patients with pre-existing skin lesions was from photodamage or cancer risk, including actinic keratoses, lentigos, and porokeratoses. Also, 46% of patients with NMSC have associated iatrogenic risk factors, including exposure to prolonged immunosuppression, radiation therapy, and voriconazole therapy. Moreover, early diagnosis of these patients may reduce future complications, such as tumor growth. Educating individuals about common locations for the different forms of skin cancer may enhance their detection during self-evaluations.

Skin Cancer Detection

Screening patients thoroughly during routine physical exams has been lacking in the healthcare system. Data suggests gaps in dermatological care for surveillance, and delay in skin cancer diagnosis, despite identifiable risk factors. A systematic review conducted by Loescher et al. (2018) identified updates on advanced practice registered nurses (APRNs) knowledge and performance on skin cancer detection, as knowledge and skills are needed to engage in the early detection. The main barrier to performing clinical skin examinations (CSE) may be lack of proper skin cancer detection training, which determines performance levels, confidence, and ability to

recognize suspicious lesions. A descriptive exploratory study stressed that the reason why APRNs and APRN students lacked confidence in their ability to recognize benign/malignant lesions may be from not having enough exposure to skin conditions during patient assessments (Woodmansee, Turnage, & Loerzel, 2019). Proper skin cancer assessment training may increase the knowledge and confidence of providers, which can lead to positive patient outcomes.

Additionally, a study by Chen, Woyansky, and Zundell (2015) provided pediatric and family nurse practitioners students with educational material to enhance their ability to detect skin cancer lesions and identify patient specific risk factors. The study found that education has a strong positive correlation with increased student confidence regarding knowledge about various skin cancers and detection among the minority population. It may be that the higher the confidence and knowledge of the providers, the higher the success rate of early identification of skin cancer characteristics and warning signs.

Screening Tools

There is a lack of adequate screening tools utilized in healthcare practices. Available methods are naked-eye examinations, dermoscopic examination as well as the assessment of the risks for skin cancer in all patients (Fors et al., 2020). An important question is: How accurate are risk-assessment tools as a screening test for skin cancer? Identifying factors that predict skin cancer risk may enhance targeted screening, diagnosis, and proper follow-up for all patients.

A study by Nikolić et al. (2014) examined participants who completed an extensive interview and skin examination to assess risk factors for melanoma. The main goal of the screening was to identify individuals at risk of developing melanoma. This study highlighted melanoma risk factors as: UV exposure, sunbeds, blistering of sunburns, skin phototype, and family history. The logistic regression model of risk factors for melanoma predication included: level of education, intermittent

exposure, use of sunbeds, hormonal contraceptive therapy, solar damage of the skin, Fitzpatrick phototype, hair color, eye color, and number of common nevi. The logistic regression model of risk factors for melanoma predication resulted in UV exposure being the most prevalent. Although blistering sunburns are known to be considered a risk factor for skin cancer, the study's data failed to confirm that. The model was used to identify risk factors and behavioral habits that lead to melanoma development. If exposure of sunbeds was before the age of 35, then the risk of getting melanoma was 75% higher. Reporting biases in participants may occur to estimate accurate association of risk factors for skin cancer. For example, when interviewing participants, the rates of sunburns and sunscreen use may not be accurately underreported. Thus, it is important to educate individuals at risk for developing skin cancer regarding skin cancer risk factors as well as protective factors to decrease the likelihood of skin cancer, specifically in the young adult population since they tend to have higher UV exposure.

Fitzpatrick Skin Phototype. Skin phototype is based on the Fitzpatrick Skin Phototype Classification (FSPC). It is the most common self-assessment scale to classify skin type based on the amount of pigment the skin has and its reaction to sun exposure (Fors et al., 2020). The tool could assist with the predication of an individual's overall risk of sun damage and skin cancer. However, the validity and reliability of the FSPC scale are not good indicators of UV sensitivity, because skin color by itself does not define reactivity to the sun. Further research is needed for the scoring components including age groups, skin tones, and different populations but the FSPC scale still plays an important part in epidemiology for estimating the risk of skin cancer. A visualization of FSPC is presented in Table 1.

Table 1

Fitzpatrick Skin Type

Skin type	Typical features	Tanning ability
I	Pale white skin, blue/green eyes, blonde/red hair	Always burns, does not tan
II	Fair skin, blue eyes	Burns easily, tans poorly
III	Darker white skin	Tans after initial burn
IV	Light brown skin	Burns minimally, tans easily
V	Brown skin	Rarely burns, tans darkly easily
VI	Dark brown or black skin	Never burns, always tans darkly

ABCDE Rule. Lattoofi et al. (2019) provides an in-depth explanation of the ABCDE algorithm to help detect melanoma. The ABCDE system stands for: asymmetric [A], irregular border [B]; varied color [C], diameter ≥ 6 mm [D], elevation or enlargement[E]). This system had a sensitivity of 50% to 97% and a specificity of 96% to 99% for the histologic diagnosis of skin cancer. Asymmetry is one of the important features to determine whether the skin lesion is benign or malignant. Next, the shape of the border/edges give out the nature of the lesion. Small irregularities can exhibit melanoma, while benign lesions have smooth edges. Third, the color variability can be measured by identifying the manifestation of those color variability within the segmented lesion. Lesions have different colors (blue, white, red, white, brown, and blue grey). Skin cells are fast growing as compared to other cells. Any lesion of a diameter greater than six millimeters is considered a melanoma. To reduce the incidence of melanoma, healthcare professionals should be aware of the ABCDEs of skin cancer. It is also important to teach the

public about the ABCDE method when performing skin cancer self-screening so they can properly identify any abnormal lesion early in the process and receive adequate treatment.

Risk Prediction Model

A skin cancer risk stratification tool may be useful in a community setting. Shetty et al. (2020) conducted a study in which 507 adults were screened from a volunteer-based population with high sun exposure levels. The questionnaire provided was used to predict keratinocyte cancers (KCs) and melanoma. Risk factor categories were age, sex, ancestry, smoking status, hair color, skin color, tanning ability, number of sunburns as a child, number of moles, family history of melanoma, number of excised skin cancers, and skin checks within the past three years. It was concluded that risk scores for melanoma require larger populations for stronger testing, and risk scores using patient self-reported data may be too generalized to be able to identify participants who have a prevalent skin cancer risk. Alongside screening, if patients are also examined by a healthcare provider, this may enhance cancer diagnosis. Thus, more research is needed to improve the detection of skin cancer in vulnerable populations.

Patient Barriers to Identifying Skin Cancer

Even though efforts are put in place for the development of screening protocols, it is necessary to identify patients' current knowledge base, behaviors, and recognition of skin cancer. Skin cancer behaviors are modifiable and could be amendable through health education and identification of risk factors (Celik et al., 2018). Nonmodifiable risk factors may include fair skin, presence of moles, family history. Ultraviolet radiation (UVR) exposure is the greatest modifiable risk factor for the occurrence of all types of skin cancer.

Behaviors

Skin cancer is preventable, yet it is still one of the most common forms of cancer in the United States with increasing rates, in particularly melanoma (Trad & Estaville, 2017). Photoprotective behaviors include using sunscreen, seeking shade, wearing protective clothing, whereas risk behaviors may include sunburns and tanning. The Centers for Disease Control (CDC) indicated that indoor tanning is hazardous, especially during early adulthood (Trad & Estaville, 2017). These behaviors may be dependent on patient demographics, specifically skin color. For instance, the use of tanning beds differs by ethnicity. It may be that participants who have a darker skin color assume that they are not as susceptible to skin cancer as opposed to those with lighter skin and therefore participate more in indoor tanning. Protective behaviors may be modified through participant engagement in skin health and increasing knowledge of skin cancer appearance,

A total of 512 college students participated in a study by Trad et al. (2017). In the study, 72.46% of female students and 27.54% of male students completed a survey. This study was based on the following three survey questions: (a) Do you use tanning salons? (b) Do you know what skin cancer looks like?; and (c) Do you conduct self-examinations for skin cancer? The participants did not receive any education before answering the research questions because the survey was designed to assess if students needed more education about skin cancer. The results revealed that the use of tanning beds varies depending on different ethnicities, the ability to identify skin cancer differs by sex, and skin cancer self-exams differ by ethnicity. It should also be noted that statistics can vary significantly if ethnic groups are not evenly selected. In that study, the ethnicity groups were evenly split among whites, Hispanics, and African Americans. The number of white students who did not perform self-exams (55%) differed when compared to Hispanics and African Americans students

who never performed self-examinations (81% and 86%). This may be because Hispanics and African Americans may not feel that they are at risk of developing skin cancer.

Protective Behaviors

A descriptive, cross-sectional study was conducted by Celik et al. (2018) to assess knowledge and protective behaviors regarding skin cancer among 952 nursing students. For the data collection, a questionnaire was completed. It was composed of three parts: (1) socio-demographics and skin characteristics; (2) knowledge about skin cancer prevention; and (3) preventive behaviors. Table 2 outlines the protective behaviors among the nursing students to prevent skin cancer.

Table 2

Protective Behaviors

Behavior	Protective behavior	
	n	%
I avoid the sun most of the time when I am out between 10:00 and 16:00.	677	71.1
I wear a wide-brim hat/cap, etc., most of the time when I am out between 10:00 and 16:00.	307	32.5
I wear light-colored, tightly woven loose clothes most of the time when I am out between 10:00 and 16:00.	582	61.1
I wear sunglasses most of the time when I am out between 10:00 and 16:00.	503	52.8
I do not swim in the sea most of the time when I am out between 10:00 and 16:00.	487	51.2
I do not sunbathe on the beach most of the time when I am out between 10:00 and 16:00.	578	60.7
I regularly put on sunscreen to protect myself from the sun's rays before going out.	422	44.3
I put on sunscreen with a protection factor of 15 or higher to protect myself from the sun's rays.	506	53.2
I regularly reapply sunscreen every 3 h to protect myself from the sun's rays.	319	33.5
I reapply sunscreen to protect myself from the sun's rays after swimming in the sea.	492	51.7
When I go to the seaside, I stay until I am getting a tan.	697	73.2
I regularly go to a tanning salon to get a tan.	873	91.7
I do not apply lotion or oil to get a tan.	568	59.7
I do not apply cheap/artificial suntan cream on my skin.	755	79.3
I stay indoors to protect myself from sunburn.	607	63.8
I stay in the shade to protect myself from sunburn.	772	81.1
I apply skin-lightening cream to protect myself from sunburn.	760	79.8
I drink 8–10 glasses of water a day.	653	68.6
I regularly have the doctor check any spots or moles on my body.	184	19.3
I regularly do a skin self-assessment.	450	47.3
I never permanently tattoo my skin.	724	76.1
I prefer cosmetic products that do not contain petroleum.	706	74.2
I certainly wear gloves while doing cleaning.	337	35.4

The authors of the study concluded that results are not pro-skin cancer prevention. For instance, students preferred to darken their skin color by tanning whether it was indoor/outdoor, and most of the students did not apply sunscreen when outside. This study highlighted that nursing students had moderate knowledge about skin cancer but refused to take adequate measures to protect themselves from risk factors. Further, students may benefit from participating in seminars and workshops to increase their knowledge about skin cancer risk factors and skin self-assessment skills. It is important to note that not only should young adults protect themselves from UV exposure, but they also need to be mindful about permanent tattoos and the use of cosmetic products. Tattoos may have toxic ingredients in the tattoo ink, and over time when tattoos begin to fade, it is possible for cancer-causing compounds to form. Thus, further research is needed to assess barriers that prevent implementation of skin cancer protective behaviors.

Attitudes About Sun Exposure

A cross-sectional study measured knowledge, behaviors, and attitudes regarding being tan in a sample of 315 college students (Basch et al., 2017). The researchers in the study mentioned that the results were not biased with health-related majors versus non-health-related majors. The college students' majors did not impact the attitudes or behaviors of the participants. The survey was based on yes or no answers. The participants were asked: "Suntan looks healthy?", "Suntan looks attractive?", and "I am at risk of skin cancer?" Out of the 325 respondents, 30.2% reported wearing UV blocking sunglasses, 29.5% were reapplying sunscreen in the summer, and 27.6% were wearing sunscreen with a minimum SPF of 15 when in the sun for at least one hour. These results may be highly relatable to college students who perceive suntans as appealing or attractive. The attitudes of students towards sun exposure may be preexisting and not a result of the students' educational majors.

Knowledge Gaps

Screening tools utilized were not specific nor individualized. The studies were limited to small sample sizes. Most studies implemented the use of convenience sampling which affects the reliability of results. These results cannot be generalized to all college students since some of the students that participated in the studies had a health related major. Many of the research studies assessed whether the patients completed the self-examination but failed to focus on the patient's knowledge level about self-cancer screening. Based on the patient's knowledge base, further education can be provided to the patient regarding the benefits of cancer screening.

Conclusion

Individuals of different ages and from diverse ethnic groups are at risk for skin cancer, regardless of their skin color. Educating young adult college students about skin cancer and adherence to recommended guidelines to prevent skin cancer are important because skin cancer prevention can improve quality of life by reducing future burdens, such as monetary costs and time spent commuting to and from specialist's appointments. Educational interventions to prevent skin cancer in the young adult population is important: therefore, having universities support skin cancer prevention strategies will help target this population to promote positive health outcomes. University or postgraduate students were found to be more aware and cautious about the risk factors of skin cancer and have better perceptions and attitudes because they are more likely to have more knowledge regarding risks and preventative measures. College students can benefit from increased education regarding self-skin assessment, risk factors, and adherence to protective skin behaviors to increase skin cancer detection and treatment and decrease skin cancer prevalence.

PICO Clinical Question/Purpose/Objectives

Defining sun-protective factors and implementing the use of screening methods for early detection of skin cancers are important to decrease predisposing risk factors among young adults. Many health problems can manifest in adulthood if behaviors are not corrected (Vogel et al., 2017). The purpose of this project was to determine whether an educational presentation can improve college students' knowledge and behaviors for identifying skin cancer indicators at the a major state university's Student Health Center in South Florida. College students were provided with a pre-test on skin cancer, then an educational intervention (applying current practices of skin cancer screenings and prevention), and lastly, a post-test. The goals of implementing skin cancer screening were to reduce skin cancer risks in college students and to increase skin protective behaviors.

The PICO question was as follows: Will a clinical educational intervention increase knowledge and behaviors of skin cancer among college students?

- **P**opulation: College students at a major state university's Student Health Clinic
- **I**ntervention: An educational intervention on skin cancer and appropriate preventative measures
- **C**omparison: None
- **O**utcomes: Changes in participant's knowledge and behavior on skin cancer prevention

The objectives of this QI (Quality Improvement) project included: 1) Development of a skin cancer skin educational PowerPoint presentation to be presented to university students to improve their knowledge and behaviors towards skin cancer prevention; 2) Development of a pre- and post-test regarding skin cancer prevention to gauge the amount of learning that took place after the

implementation of the educational intervention; 3) Elaboration and discussion with participants to address any questions/concerns.

Definition of Terms

The definition of terms in this QI project included BCC, SCC, nonmelanoma skin cancer (NMSC), melanoma, and screening tools. The three most common skin cancers are: basal cell carcinoma (BCC), squamous cell carcinoma (SCC), and melanoma. BCC and SCC are both forms of nonmelanoma skin cancers, as they have steadily been on the rise (Ciążyńska et al., 2021). BCC is the predominant type, with a BCC to SCC ratio between 1:1 and 10:1 depending on the population, ethnic group, and sex (Ciążyńska et al., 2021). Melanoma is a distinctive cancer because it grows fast and originates in the melanocytes, which are the pigment-producing cells.

Screening tools are used to detect cancer at an early stage and are designed as a guide for clinicians to recognize medical problem. Clinicians may include registered nurses, physicians, mid-level providers, and other health professionals. For example, dermoscopy has become a useful tool in detecting skin cancer because it increases diagnostic accuracy and therefore signifies a prompt for excision of skin lesion. The understanding of techniques such as ABCDE rule and an implemented checklist is also a requirement to use in conjunction with dermoscopy (Selvarasa & Aponso, 2020). Together they are used to collect data and analyze images obtained from the dermoscopy.

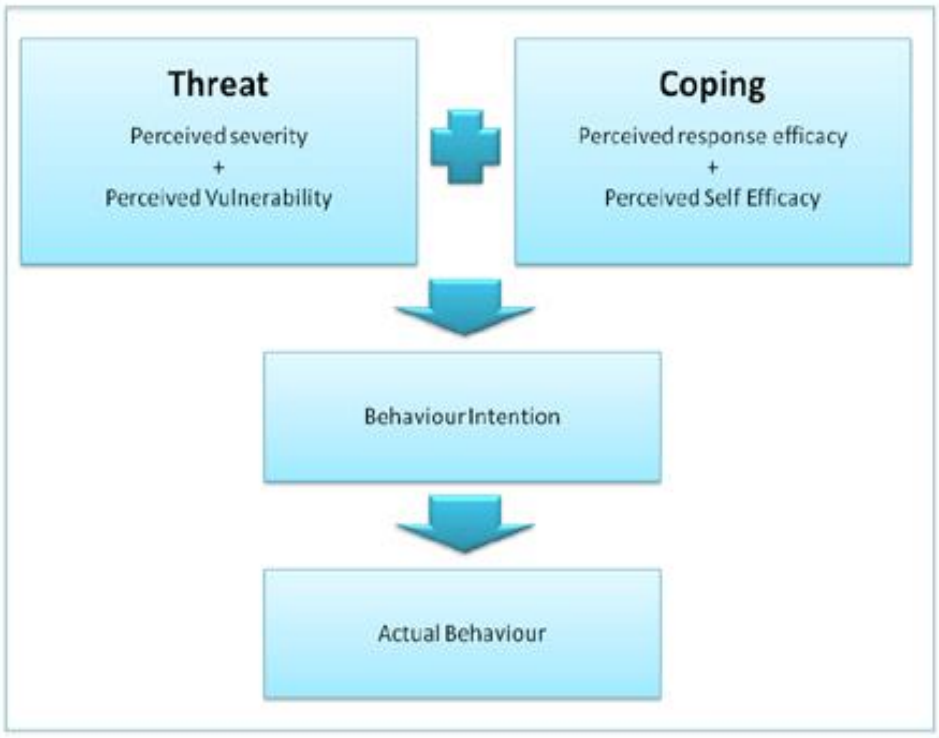
Theoretical Framework

The Protection Motivation Theory (PMT) was developed by Rogers in 1975 (Figure 1). It describes how individuals are motivated to react in a self-protective way towards a perceived health threat. This theory had been chosen to frame the development of this QI project to positively shape the patients' knowledge, attitudes, and behaviors of skin cancer prevention. Protection motivation is originated in two basic components: 1) threat appraisal and 2) coping appraisal (Heydari et al., 2021).

The threat appraisal assessed the participants' knowledge and behaviors and their susceptibility to the threat (which is skin cancer). The coping appraisal was the participants' belief that the recommended protective behaviors will positively affect the reduction of the threat. Moreover, this QI project focused on the importance of adopting skin-protective practices to increase the prevention of skin cancer.

Figure 1

The Protection Motivation Theory (PMT)



Methodology

Study Design

The project followed a quasi-experimental research design. The QI project was conducted at an university's Student Health Clinic, which assessed the impact of an educational intervention on skin cancer knowledge in college students. These college students were patients seen at the Student

Health Clinic. Pre-test and post-test surveys were completed by participants to understand the educational intervention's impact. The educational intervention consisted of education on skin cancer risk factors, protective behaviors to perform, and screening tools used in practice.

Setting and Sample

This QI project was conducted at a Student Health Clinic, a clinic that provides student-focused medical care. The clinic promotes healthy lifestyles and facilitates research activities for the academic success of their students. Student Health provides not only primary medical care but also specialty care tailored to meet the needs of college students. The sample size goal was 10-15 college students, who are patients in the Student Health Clinic. Total number of participants attained was 15. With the assistance of the medical director and office manager, the participants were recruited in-person to voluntary participate in the project.

Intervention

Informed consents were obtained from all participants via Qualtrics. The DNP candidate developed a 15-to-20-minute educational PowerPoint (PPT) presentation for the participants. The PPT presentation included text, graphics, charts, and animations for the participants. Evidence-based educational information was delivered by this student in a face-to-face lecture-style format with opportunities for questions, that took place in the main clinic's conference room. Participants completed pre- and post-intervention surveys. Within the surveys, a demographic questionnaire was incorporated that assessed the student's skin characteristics, in which asked information regarding their sex, age, educational level, color of eyes and hair, family history of skin cancer, knowledge of ingredients in cosmetics, and skin characteristics.

Measures/ Instruments

The pre- and post-intervention surveys were utilized via Qualtrics to measure the changes in participant's knowledge, behaviors, and awareness in identifying skin cancer risk factors. The surveys assessed the participant's current knowledge and behaviors in identifying skin cancer and safety measures. The questions used in the pre- and post-intervention surveys were the same. The surveys assisted in establishing the internal validity of the study, since the DNP candidate was trying to determine if a clinical educational intervention increases knowledge and behaviors of skin cancer among college students.

Data Collection

Flyers containing information about the study and the Co-PI's (DNP candidate) contact information were posted in the Student Health Center. Recruitment took place in-person at the university's Student Health Center. Immediately after the potential participants' clinic visit at the Student Health Center was complete, the medical doctor provided the potential participants with a brief explanation of the project. If they agreed, then the medical assistant or the medical doctor escorted the individual to the waiting room in the Student Health Center. The DNP candidate introduced herself to the potential participant. If the potential study participant agreed, then the DNP candidate escorted the study participant to the private conference room to complete the pre-test, educational PowerPoint presentation, and post-test.

With consent via Qualtrics, participants were able to complete an anonymous pre-test questionnaire to assess their knowledge on skin cancer indicators and proper behavioral measures to decrease risk of skin cancer. The survey was completed individually and expected to take up to 10-15 minutes to complete. Participants were then provided with a PowerPoint educational presentation, which lasted approximately 20 minutes. Immediately after completion of the educational session, the

participants were asked to complete the post-test questionnaire via an electronic link. The post-test was identical to the pre-test and expected to take 10-15 minutes to complete.

No identifiable private information was collected. Demographic data, including gender, age, skin characteristics, and educational level was obtained as part of the survey. Additionally, the pre-test/post-test survey questionnaires were used to collect data related to the participants' knowledge of skin cancer indicators and behavioral measures.

Data Analysis

The Qualtrics platform provides information such as the mean, standard deviation, variance, and number of respondents. The pre and post intervention surveys were scored with a percentage, and a mean score was calculated utilizing a samples paired t-test via SPSS (Statistical Package for the Social Science). The SPSS software platform offers advanced statistical analysis, text analysis, and integration with big data. The QI project aimed to demonstrate that education will have a positive effect on pre/post-test designs based on mean knowledge and behavioral scores. The data analysis will be further discussed in the Results Section VII.

Protection of Human Subjects

The DNP candidate has been educated on the basics of Human Subjects Research and has completed the Collaborative Institutional Training Initiative (CITI) program training in the protection of human research subjects. The protection of human subjects had been established through Florida International University (FIU) Institutional Review Board approval (IRB). Pre- and Post-test surveys were numbered and didn’t include any identifying information, such as the participant’s name, address, or telephone number. After consents were obtained via Qualtrics, a unique identifier automatically generated for each participant. A unique identifier was provided so the participant will

type it in the pre-test and use the same identifier for post-test. Therefore, the surveys only collected demographic data, the participants remained anonymous, and their responses were confidential.

Benefits

The benefits to participants included improvement in their awareness and knowledge of skin cancer and skin-safety measures. Participants learned about different skin cancer screening tools and early detection signs of skin cancer. This led to participants properly taking action to implementing skin-protective behaviors. The expectation for this quality improvement project was to provide college students with knowledge and awareness to take care of their skins' health to aid in the prevention of skin cancer.

Risks

Participants were not expected to experience risks, harms, or discomfort through the participation of this quality improvement project. Risks are not greater than those faced in normal life while participating in a similar activity. The participants were notified on the consent form and surveys that while this study is voluntary and there are no known alternatives other than not taking part in this study. There were also no costs associated with participation.

Results

The purpose of this quality improvement project was to evaluate the impact of providing education on skin cancer screening and risk factors for college student patients at the university's Student Health Clinic. Specifically, if it will enhance their knowledge and promote positive protective behaviors in identifying/detecting skin cancers. A total of fifteen college students participated in the quality improvement project on a 1:1 basis. After each student completed the in-person post-test survey, immediately after the educational PowerPoint, an incentive of a $10 gift card was provided to them.

Samples Paired T-Test

Paired samples t-tests were used to examine whether the change in knowledge and the change in behaviors was statistically significant. In the table below, the mean difference of pre/post knowledge scores was 0.9 and the mean difference of pre/post behavior score scores was 1.1. In addition, Graph 1 is displayed for an equivalent reference of Table 3.

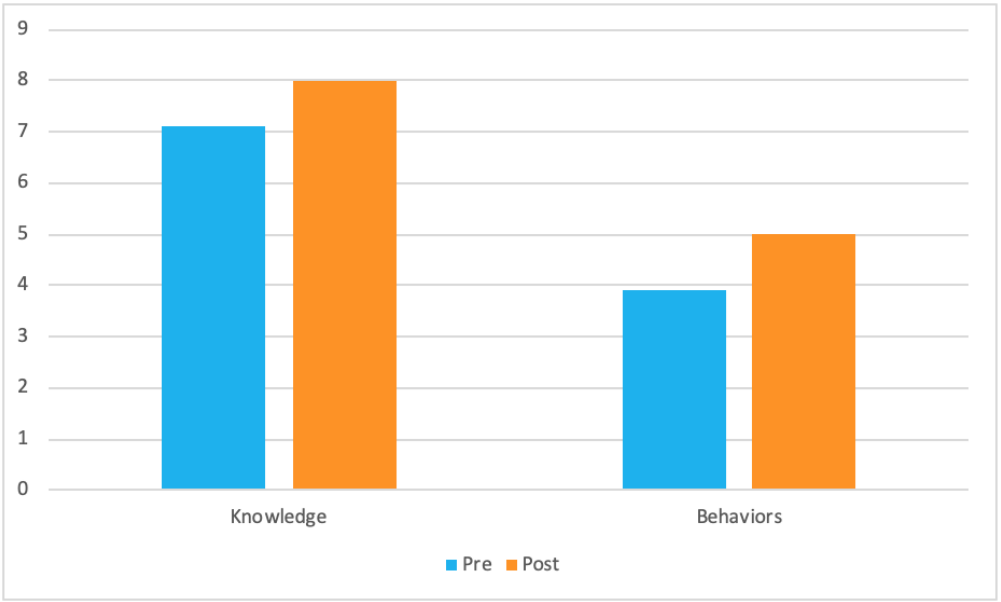
Table 3

Paired Samples T-Test Mean Average Score For Pre/Post Knowledge and Behaviors

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Knowledge Pre	7.0667	15	1.16292	.30026
	Knowledge Post	8.0000	15	.84515	.21822
Pair 2	Behaviors Pre	3.9333	15	2.08624	.53866
	Behaviors Post	5.0000	15	2.39046	.61721

Graph 1

Equivalent Reference of Table 3 in Graph



Data Analysis

Upon examination of the distribution of continuous outcomes, parametric statistics were employed to assess change from pre- to post-. Specifically, paired samples t-tests were used to examine whether the change in knowledge and the change in behaviors was statistically significant. To examine whether knowledge differed by gender, an independent samples t-test was used to examine whether baseline knowledge differed by gender and a mixed ANOVA with knowledge as the within-subjects variable and gender as the between-subjects variable was used to determine whether the knowledge gains differed by gender.

Results

Sample Characteristics

All participant characteristics assessed are provided in Table 4. Most of the sample was female (73.3%), and all were earning their bachelor's degree (100%). About three quarters of the sample was between 18 and 23 years old (73.3%) and the remaining were between 24-34 (26.7). While most had dark eyes (93.3), variation in skin color and hair color was observed. Twenty percent of the sample had a family member with skin cancer, and most had experienced a sunburn in the past (80.0%) although the effect of the sun on their skin also varied. Finally, the majority of the sample indicated that they do not pay attention to ingredients in sunblock (66.7).

Distribution of Scores

Prior to running statistical analyses, the distribution of pre- and post- knowledge and pre- and post- behavior were examined for normality. Despite the modest sample size, the variables were found to be normally distributed based on acceptable values of skewness and kurtosis (<1). In addition, tests of normality were not violated for all variables except knowledge post. However, a visual inspection of the histogram deemed the distribution to be normal enough.

Knowledge

Change in knowledge from pre- to post- was found to be statistically significant (t (14) = -2.36, p = .034) with knowledge scores being higher at the post-test. At the pre-test, females (M = 7.17) had higher knowledge than males (M = 5.80), but the difference was underpowered and approached significance (t (15) = 2.01, p = .063). In addition, the change in knowledge from pre- to post- was not found to be significantly difference between males and females (F (1, 13) = 1.61, p = .226). The change in knowledge from pre- to post- was also evaluated for participants with and without a family history of skin cancer. No significant interaction was detected (F (1, 13) = 0.11, p = .750) indicating that the change in knowledge did not differ based on family history of skin cancer.

Behavior

Change in behavior from pre- to post- was also underpowered and approached significance (t (14) = -2.09, p = .056) with behavior scores at post- (M = 5.00) being higher than scores at pre- (M = 3.93).

Table 4

Demographic Characteristics

Characteristic	*N* (%)
Gender	
Male	4 (26.7)
Female	11 (73.3)
Age	
18-23	11 (73.3)
24-34	4 (26.7)
Education Level	
Bachelor's Degree	15 (100.0)
Eye Color	
Fair	1 (6.7)
Dark	14 (93.3)
Skin Color	
White, European Descendant	1 (6.7)
White, Mediterranean or Levantine Descendant	5 (33.3)
Olive, Mixed European and Indigenous Descendant	2 (13.3)
Yellow, Mixed with Mid Asian Descendant	1 (6.7)
Brownish/Yellowish, Indigenous or South Asian Descendant	3 (20.0)
Light Brown, Mixed European and African Descendant	3 (20.0)
Hair Color	
Light Brown	1 (6.7)

Medium Brown	3 (20.0)
Dark Brown	7 (46.7)
Black	4 (26.7)
Family Member with Skin Cancer	
No	12 (80.0)
Yes	3 (20.0)
Squamous Cell Carcinoma	1 (33.3)
Malignant Melanoma	2 (13.3)
Had a Sunburn in the Past	
No	3 (20.0)
Yes	12 (80.0)
Redness only	11 (91.7)
Blisters	1 (6.7)
Effect of Sun on Your Skin	
Not affected	4 (26.7)
Skin darkening/hyperpigmentation	6 (40.0)
Rarely burns	2 (13.3)
Rarely red or swelling	1 (6.7)
Painful redness	2 (13.3)
Do you have any of the following?	
Birthmark	7 (46.7)
Moles	4 (26.7)
Both	4 (26.7)

Do you Pay Attention to Ingredients in Sunblock	
No	10 (66.7)
Yes	5 (33.3)
Occupation/Hobby	
Outdoor	5 (33.3)
Indoor	10 (66.7)

Discussion

Results of this DNP project highlight the importance of education with regards to skin cancer prevention and its effects on participant's knowledge and behavior. A study by Celik et al. (2018) gathered information on 954 participants. The majority of the sample did not have a family history of skin cancer and used cosmetics, but 64.4% of them did not look at the ingredients. Future studies should focus on educating patients about hazardous ingredients found in cosmetic products and informing them about their consequences such as contact dermatitis, acne, and skin-color changes related to cosmetic products. These results corroborate with this DNP project's results with regards to the important role that education plays on skin cancer prevention.

Knowledge

Trad and Estaville (2017) removed students in their study that were in the health professions major to avoid bias in the results since these students should have more knowledge about skin cancer than other college students in general. In comparison, this QI project asked participants their educational level anonymously without eliminating participants if they were in the health professions majors or not, to limit bias. After reviewing the results, all participants had their bachelor's degree, therefore the DNP candidate could not distinguish whether having a higher

educational level would have a correlation with higher knowledge scores. In a study by Trad and Estaville (2017), 38% of female students reported that they knew what skin cancer looks like and 29% of male students reported that they could identify skin cancer. When compared to this QI study, the participants' general knowledge was assessed specifically by asking how skin cancer lesions look like. The difference in this QI project is that results showed that there was no difference in knowledge from pre- to post-test scores between males and females, as both sexes had an increase in mean knowledge scores.

Behaviors

The QI project reported that approximately 47% of participants completed self-skin assessment, however, after receiving education there was a slight increase of 26% saying that they now will complete self-skin assessments. Based on these findings, college students are inadequately informed about skin cancer, but after education was provided, their knowledge increased which had a positive effect on their behavior since now they are aware about what actions to take to prevent skin cancer.

The results of a study by Celik et al. (2018), emphasized that the percentage of negative behaviors by students is higher than positive behaviors with regards to skin cancer prevention. Students' negative behaviors consisted of neglecting to: (a) avoid tanning; (b) wearing protective clothing; (c) applying sunscreen; (d) performing skin self-assessments; and (e) having a medical provider check spots, moles, and/or lesions. Contrary to the results of this study, participants in this QI project mostly displayed behaviors that are positive which will help with skin cancer prevention. Also, participants understood that reducing time spent outside between 10 a.m. and 2 p.m. and wearing sunscreen were the mean factors to prevent skin cancer. This further emphasizes the importance of education with regards to increasing positive behaviors in individuals.

Limitations

Several limitations have been identified that may have influenced the study's findings. The project consisted of a small and convenient sample size of young adult college students from a single student health clinic which limits generalizability to other healthcare groups or settings. Since the project lacked a control group, the DNP candidate was unsure if any impact on participant's knowledge and behaviors on skin cancer prevention and awareness was due to the educational intervention or other factors (e.g., additional training). Also, during the pre-test, the participants may have been uninterested and less careful in considering their responses, but after attending the educational intervention, they may have taken the post-test more seriously.

Implications for Practice

Despite preventative guidelines for skin cancer screening and sun-protective behaviors, the incidence of skin cancer still is on the rise (Shue-McGuffin & Powers, 2021). This project specifically utilized theoretical foundations of the Protection Motivation Theory (PMT) by using an evidence-based educational tool to enhance patients' knowledge, thus emboldening them to identify skin cancer risk factors regarding nonmelanoma/melanoma, and early changes in skin lesions, which can ultimately decrease their skin cancer occurrence and increase survival.

Advanced practice registered nurses (APRNs) are a vital part of the health care system and provide necessary educational counseling to patients to enhance health and wellness and aid in disease prevention. They are at the forefront because they have the opportunity to inspect and assess skin lesions thereby increasing the chances of early detection of skin cancer. Increasing patients skin cancer knowledge and awareness can also lead to reducing healthcare costs associated with nonmalignant and malignant skin lesions (Shue-McGuffin & Powers, 2021). This quality improvement project's findings proved that a face-to-face interactive educational PowerPoint

presentation on skin cancer knowledge and prevention increased college students' awareness of risk factors and preventative strategies to avoid skin cancer, which can lead to better practices. It opened the door for questions on the patients' behalf, which made it possible for the DNP candidate to clarify any specific skin cancer concerns and provide further education on this topic. APRNs with a Doctor of Nursing Practice (DNP) have an impact on decisions that influence health policy and nursing practice and can serve as a resource for patients by helping identify educational needs.

Dissemination and Sustainability

APRNs must continue to be active in contributing evidence-based guidelines and standards to improve healthcare outcomes for patients. This QI study's results are appropriate for dissemination within various settings, such as in dermatology, pediatric, and student health clinics. The project's educational intervention may be of benefit to healthcare providers since it can increase clinicians' knowledge related to sun safety to promote education and secondary prevention in their patient population.

Project findings will be presented at the American Association of Colleges of Nursing Conference. A manuscript will also be submitted to the following peer-reviewed journals: Primary Health Care, Journal of Healthcare Communications. In addition, results of this project will be disseminated locally within the clinical urgent-care setting where the DNP student is practicing. This will be accomplished by direct patient contact and discussions about skin cancer. Educational flyers will also be accessible to patients in the clinic for their personal use.

An important focus is on the sustainability of this evidence-based project within the healthcare organization. It is essential to continue promotion of the QI project's educational intervention within the Student Health Clinic setting in which the project was completed at. The

educational PowerPoint intervention will be portrayed on television screens at the university's Student Health Clinic waiting rooms.

Conclusion

The prevalence of skin cancer continues to be on the rise as incidence rates of both NMSC and melanoma skin cancer have markedly increased. It has been established through the literature review that skin cancer is highly treatable when detected early. The majority of participants did not have a family history of skin cancer, but for those who did, malignant melanoma was most significant. Also, there was no significant change in knowledge for participants with/without family history of skin cancer when comparing the pre- and post-test.

Post-intervention scores support the idea of students benefitting from being informed on skin cancer secondary prevention during their routine health visits. The results of this study highlighted an increase in knowledge levels and protective behaviors of college students at the Student Health Clinic. Additionally, interaction between participants and the DNP candidate provided positive encouragement for them to engage in healthy sun-safety practices. Seminars and workshops that educate students about skin cancer risk factors, early detection, and importance of self-skin assessments can be helpful for young adult college students.

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Appendix A

FIU | FLORIDA INTERNATIONAL UNIVERSITY

ADULT ONLINE CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Title: Improving Skin Cancer Knowledge and Prevention Among College Students: A Quality Improvement Project

SUMMARY INFORMATION

Things you should know about this study:

- **Purpose:** This project's primary objective is to improve college student's knowledge and awareness of skin cancer risk factors and skin cancer prevention.
- **Procedures**: Refer to the information below.
- **Duration:** 40-50 minutes.
- **Risks**: Participants are not expected to experience risks, harms, or discomfort through the participation of this quality improvement project.
- **Benefits:** Benefits to participants include improved knowledge of skin cancer risk factors, skin cancer prevention, and sunscreen importance.
- **Alternatives:** There are no known alternatives available to you other than not taking part in this study.
- **Participation:** Taking part in this research project is voluntary. You can withdraw at any time without giving reason or without cost.

Please carefully read the entire document before agreeing to participate.

PURPOSE OF THE STUDY

All data regarding participants knowledge on skin cancer and sun safety protective factors will be collected anonymously. Only investigators will have access to the data collected

NUMBER OF STUDY PARTICIPANTS

If you decide to be in this study, you will be one of 10-15 people in this research study.

DURATION OF THE STUDY

The study's total duration will be 40-50 minutes.

PROCEDURES

If you agree to be in the study, we will ask you to do the following things:
1. Sign electronic agreement consent
2. Complete pre-test survey
3. Active listening during educational intervention
4. Complete post-test survey

RISKS AND/OR DISCOMFORTS

Participants are not expected to experience minimal risks, harms, or discomfort through the participation of this quality improvement project. The risks are not greater than those faced in normal life while participating in a similar activity. There is no cost or legal intervention. If a participant feels uncomfortable with any of the interactions or is concern about the content of the information shared with the interviewer, he/she may choose to withdraw from the study.

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BENEFITS

Benefits to participants include improved knowledge of skin cancer awareness and protective measures.

ALTERNATIVES

There are no known alternatives available to you other than not taking part in this study. Any significant new findings developed during the course of the research which may relate to your willingness to continue participation will be provided to you.

CONFIDENTIALITY

All data will be collected anonymously. No identifiable private information will be collected as a part of the pre-test and post-test surveys. Only investigators will have access to the completed pre-test and post-test surveys. There will be no hard copies of the pre- or post-test surveys. Data collected from the pre-test and post-test surveys will be tabulated via Qualtrics, an online system, and will be maintained on a password protected laptop computer.

USE OF YOUR INFORMATION

No personal identifiable information will be used for this study.

COMPENSATION & COSTS

You will not receive a payment for your participation. There are no costs to you for participating in this study.

RIGHT TO DECLINE OR WITHDRAW

Your participation in this study is voluntary. You are free to participate in the study or withdraw your consent at any time during the study. You will not lose any benefits if you decide not to participate or if you quit the study early. The investigator reserves the right to remove you without your consent at such time that he/she feels it is in the best interest.

RESEARCHER CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Rebecca Behnejad at rbehn002@fiu.edu or (954) 662-9443.

IRB CONTACT INFORMATION

If you would like to talk with someone about your rights of being a subject in this research study or about ethical issues with this research study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. By clicking on the Qualtrics link I agree to participate in this QI project.

Appendix B.

Survey Questions

Demographics and Skin Characteristics

1. Gender:

   □Male

   □Female

   □Other

2. Age:

   □18-23

   □24-34

   □35-45

3. Educational Level

   a) Bachelor's degree

   b) Master's degree

   c) Doctoral degree

4. What is the color of your eyes?

   a) Fair (blue, green, hazel)

   b) Dark (black or brown)

5. What is the color of your skin?

6. What is the color of your hair?
    a) Blonde
    b) Red
    c) Light Brown
    d) Medium brown
    e) Dark brown
    f) Black
7. Do you have or had a family member with skin cancer?
    a) Yes
        i. If yes, which type:
            1. Squamous cell carcinoma
            2. Basal cell carcinoma
            3. Malignant Melanoma

4. Other

b) No

8. Have you had a sunburn in the past?

a) Yes

i. Redness only

ii. Blisters

iii. Ulcers

b) No

9. Effects of sun on your skin:

a) Not affected

b) Skin darkening/ Hyperpigmentation

c) Rarely burns

d) Rarely red or swelling

e) Swelling

f) Painful redness

10. Do you have any of the following?

a) Birthmark

b) Moles

c) Both

11. Do you pay attention to ingredients in sunscreen?

a) Yes

b) No

12. Occupation/ Hobby:

a) Outdoor

b) Indoor

Knowledge

1. The most common type of skin cancer is basal-cell carcinoma.
    a) True
    b) False
2. The most malignant cancer of the skin is melanoma.
    a) True
    b) False
3. To identify early skin cancer, a patient should complete a self-skin examination monthly.
    a) True
    b) False
4. Cosmetic products and detergents containing petroleum increase the risk of skin cancer.
    a) True
    b) False
5. Non-healing wounds on the skin may be a symptom of skin cancer.
    a) True
    b) False
6. Moles that change shape and/or color may be a sign of skin cancer.
    a) True
    b) False
7. The presence of freckles on the skin does not create a risk of skin cancer.
    a) True

b) False

8. Sunscreen should be used at least 30 minutes before going outside.
    a) True
    b) False
9. Ultraviolet rays can cause skin cancer.
    a) True
    b) False
10. All sunscreens protect against UVA and UVB rays.
    a) True
    b) False
11. Ultraviolet B (UVB) has a longer wavelength as compared to Ultraviolet A (UVA).
    a) True
    b) False
12. People who have sunburns 1-2 times per year are not at risk for skin cancer.
    a) True
    b) False

Behaviors

1. I wear sunscreen on a daily basis.
    a) Yes b) No
2. I wear UV protective sunglasses most of the time when outdoors.
    a) Yes b) No
3. I wear sunscreen even when indoors.
    a) Yes b) No

4. I wear UV protective clothing when outdoors.

    a) Yes b) No

5. I reapply sunscreen to protect myself from the sun.

    a) Yes b) No

6. I do not apply lotion or oil to get a tan.

    a) Yes b) No

7. I stay in the shade to protect myself from getting sunburnt.

    a) Yes b) No

8. I do self-skin-assessments.

    a) Yes b) No

9. I regularly have a medical provider check any spots or moles on my body.

    a) Yes b) No

Appendix C

#BeSunSmart

A Quality Improvement Study on Skin Cancer Screening

Date:
Time
Please contact Rebecca Behnejad for more information
Email: rbehn002@fiu.edu

Appendix D

Student Health Center (SHC)
11200 SW 8th Street
Miami, FL 33199
305-348-2401

Date: 5/30/2021

Ivette Hidalgo, PhD, APRN, PPCNP-BC
Clinical Assistant Professor
Nicole Wertheim College of Nursing & Health Sciences
Florida International University

Dear Dr. Hidalgo,

Thank you for inviting Florida International University's Student Health Center to participate in the DNP Project of Rebecca Behnejad. I understand that this student will be conducting this project as part of the requirements for the Doctor in Nursing Practice program at Florida International University. After reviewing the proposal of the project titled "Interventions for College Students in University Student Health Clinic on Improving Screening and Identification of Skin Cancer: A Quality Improvement Project." I have warranted her permission to conduct the project at this clinic.

This project intends to evaluate if a providing an educational presentation for participants in university's student health clinic on skin cancer indicators and proper behavioral measures will decrease risk of skin cancer and increase awareness. The project will be conducted with the previous consent of potential participants. Prior the implementation of this project, the Florida International University Institutional Review Board will evaluate and approve the procedures to conduct this project.

We're certain that Rebecca Behnejad will not interfere with the normal office performance, will keep professional manner, and follow the office standards of care. I support the participation of our providers and staff in this project and look forward to work with you.

Sincerely,

Florez-White, Mercedes, MD, PhD
Florida International University

Appendix E

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Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To:	Dr. Ivette Hidalgo
CC:	Rebecca Behnejad
From:	Maria Melendez-Vargas, MIBA, Coordinator
Date:	September 23, 2021
Proposal Title:	"Improving Skin Cancer Knowledge and Prevention Among College Students: A Quality Improvement Project."
	Approval # IRB-21-0325-AM01
	Reference # 110563

The Florida International University Office of Research Integrity has approved the following modification(s):

- Changed to the identification of subjects. The medical doctor will be introducing the project to the potential participants after their clinic visit and once they agree the Co-PI will be providing the potential participants with a detailed explanation of the project prior to the participant consenting via Qualtrics.
- Changed to how the incentive will be given to each participant. Instead of providing each participant with a gift card via email after they complete the post-test survey, the gift card will be given to each participant in-person.

Special Conditions: N/A.

For further information, you may visit the FIU IRB website at http://research.fiu.edu/irb.

MMV/em

Appendix F

Mitigation Plan for In-Person Human Research

Principal Investigator:	Ivette Hidalgo, PhD, APRN, PPCNP-BC
Protocol Title:	Improving Skin Cancer Knowledge and Prevention Among College Students: A Quality Improvement Project
IRB Approval #:	IRB-21-0325

Summary and Goals of Research Project:

This quality improvement project aims to improve college students' knowledge and awareness of skin cancer risk factors and skin cancer prevention. The target population will consist of approximately 15 college students at Florida International University's Student Health Center. With their consent, participants will be provided with an electronic link allowing them to complete an anonymous pre-test survey to assess their knowledge and behaviors regarding skin cancer. Participants will then be provided with a face to face educational PowerPoint presentation, which will last approximately 20 minutes. Participants will then be provided with an electronic link to the post-test right after the educational intervention. Educating the college students will increase their knowledge on sun safety, inform them on ways to protect their body from sun exposure, and decrease their risk of skin cancer.

Human Subject Activities Requiring In-Person Interactions:

An in person educational intervention, with the use of a PowerPoint presentation, will be provided to each participant on an individual basis.

Why the In-Person Activities Cannot be Conducted Remotely:

The project activities cannot be conducted remotely because the participants will need to give the principal investigator their undivided attention during the educational intervention. Performing the intervention remotely can negatively impact participation in the project due to technical difficulties. Also, not all participants have access to a computer or the internet to be able to participate.

Location(s) of the In-Person Activities:

The location of the in-person activity will take place at Florida International University Student Health Center, SHC, 11200 SW 8th St, Miami, FL 33199

Participant Population and the Number of Participants:

The participant population consists of 10 to 15 adult college students with no known health conditions.

Frequency and Duration for Each In-Person Activity:

The project will take place during one visit that will last for approximately 20 minutes. The principal investigator will be face to face with the participant for 20 minutes when delivering the educational presentation. This will allow for the Co-PI to elaborate information and for participants to ask questions during PowerPoint and clarify any misconceptions.

Scheduling and Screening Participants:

Participants will be scheduled by appointment to avoid participant overlap. Participants will all be screened for COVID-19 prior to seeing the healthcare provider for their clinic visit through the FIU P3 App Questionnaire.

Personal Protective Equipment (PPE):

During the project, the principal investigator will be wearing a facial covering recommended by the Centers for Disease Control. Facial coverings recommended by the Centers for Disease Control will be provided to participants if they do not have their own. However, students will be required to have surgical facial covering prior to entering the Student Health Clinic. The use of gloves, gowns, or facial shields will not be necessary.

Social Distancing:

While in the examination room where the quality improvement project will take place, social distancing with a minimum of 6 feet will be maintained at all times. The only individuals inside the room will be the principal investigator and the participant.

Personal Hygiene and Disinfecting Procedures:

All examination rooms including high touch surfaces will be disinfected with an EPA approved disinfectant before and after the participants leave the examination room. Upon entering and exiting the room, the principal investigator will perform hand hygiene with hand sanitizer.

Collecting and Transporting Biospecimens:

Not Applicable

COVID-19 Requirements from Each Clinical Facility

COVID19 Screening for patients calling for onsite appointments

1. Do you have any of these symptoms that are not caused by another condition? DENIES
2. Within the past 14 days, have you had contact with anyone that you know had COVID-19 or COVID-like symptoms? NO
3. Have you had a positive COVID-19 test in the past 10 days or are you currently waiting on the results of a COVID-19 test? NO
4. Within the past 14 days, has a public health or medical professional told you to self-monitor, self-isolate, or self-quarantine because of concerns about COVID-19 infection? NO

*This goes with question #1, if patient does not deny:

a. Fever or chills
b. Cough
c. Shortness of breath or difficulty breathing
d. Fatigue
e. Muscle or body aches
f. Headache
g. Recent loss of taste or smell
h. Sore throat
i. Congestion
j. Nausea or vomiting
k. Diarrhea