6-30-2020

Educational Interventions for Healthcare Providers to Improve Early Screening and Diagnosis of Skin Cancer in Patients with Dark Skin Tones

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Recommended Citation

De Varona, Alexander, "Educational Interventions for Healthcare Providers to Improve Early Screening and Diagnosis of Skin Cancer in Patients with Dark Skin Tones" (2020). *Nicole Wertheim College of Nursing Student Projects*. 6.
https://digitalcommons.fiu.edu/cnhs-studentprojects/6

Educational Interventions for Healthcare Providers to Improve Early Screening and Diagnosis of Skin Cancer in Patients with Dark Skin Tones

A Scholarly Project Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences

Florida International University

In partial fulfillment of the requirements
For the Degree of Doctor of Nursing Practice

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Abstract

People with darker skin tones are disproportionately affected by morbidity and mortality of skin cancers. Risk factors including social, cultural, and socioeconomic factors make them vulnerable to late detection and poor prognosis (Agbai et al., 2014; Higgins et al., 2018). This systematic review aims to synthesize available information on skin cancer with the aim of elucidating interventions for healthcare providers to promote early screening and diagnosis of skin cancer in people with darker skin tones. The information gathered in this systematic review will form the basis for the development of an evidence-based quality improvement guidelines for the education of healthcare providers on screening and diagnosis of skin cancer in the target population. The systematic review adheres to the PRISMA guideline for conducting systematic reviews and includes ten study articles obtained from the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and the Medical Literature Analysis and Retrieval System Online (MEDLINE) databases. The included studies investigate various areas including skin cancer prevention, management, and screening techniques that can be adopted by healthcare providers to improve early detection. In general, the evidence is consistent with the view that the education of healthcare providers can help to improve screening and outcomes for skin cancer patients with darker skin tones.

Keywords: Skin Cancer, People of Color, Latin Americans, Skin Cancer Screening, Skin Cancer Education

SYSTEMATIC REVIEW

INTRODUCTION

Background

The incidences of melanoma skin cancers in the United States rose by an average rate of 2.6% annually from 1985 to 2009. The current estimates project that about 2% of the population will get melanoma diagnosis in their lifetime. Melanoma skin cancers have higher mortality rates that non-melanoma skin cancers. Nonetheless, non-melanoma skin cancers make up over 98% of cancer cases (Howlader et al., 2019). This positions skin cancer as a significant public health concern in the country. Both forms of skin cancer can be diagnosed by a healthcare provider during a routine visit using visual examination. Evidence suggests that early screening and diagnosis of skin cancers significantly improves prognosis and reduces the mortality rates in patients (Tripp et al., 2016).

Skin cancer is more common in whites than in people with darker skin tones. This is as a result of the variation in the protective capacity of white skin compared to dark skin against ultraviolet radiation. In whites, exposure to ultraviolet radiation plays a major role in the development of skin cancer. On the other hand, people with darker skin tones have more organelles that produce melanin which is proven to protect the body from ultraviolet radiation. Due to the significantly higher rates of cancer in whites, most of the available medical research in the past has focused on the white's population. There has been an increase in the rates of skin cancer in people with darker skin tones despite historically lower rates (Korta, Saggar, Wu, and Sanchez, 2014). This necessitates the need for a further researcher on skin cancer in this population in order to support healthcare providers in providing clinical care.

Description of Problem

Although melanoma is more prevalent in whites, ethnoracial minority groups with darker skin tones are more likely to be diagnosed with melanomas at an advanced stage which increases their morbidity and mortality. Limited access to medical care, poor awareness on skin cancer, less frequent screening, lack of knowledge among healthcare providers, and decreased suspicion of melanoma in nonwhite patients are some of the factors that have been noted to contribute to the disparities in morbidity and mortality (Korta, Saggar, Wu, and Sanchez, 2014). Furthermore, there is a noteworthy difference in the ability of healthcare providers and patients to recognize characteristics of melanoma in whites compared to in people with darker skin tones (Garnett, Townsend, Steele, and Watson, 2016).

Historically, studies, systematic review, and efforts that investigate and promote early screening and diagnosis of skin cancer have focused on Caucasians. This has meant that a majority of the systematic reviews available to healthcare providers cater to Caucasians (Higgins, Nazemi, Chow, and Wysong, 2018). Most reviews and guidelines also simply point out the general strategies for screening and diagnosis without highlighting the differences in diagnosis for different skin tones. This translates to the lack of sufficient knowledge on strategies to enable early screening and diagnosis of skin cancer in the primary care setting. The NICE and USPSTF guidelines that were reviewed as part of the preliminary review provided no directions for healthcare providers on people with darker skin tones. According to Higgins, Nazemi, Chow, and Wysong (2018) skin cancers have a varied presentation in different skin tones. It is thus essential that guidelines are developed that emphasize the differences across populations that should inform patients and their providers. The guidelines should inform the education, surveillance, screening, and diagnosis of skin cancer (Mayer, Swetter, Fu, and Geller, 2014).

Most of the articles reviewed as part of this paper determine that there are delays in the screening and diagnosis of skin cancer in the target population. A multidisciplinary team of experienced healthcare professionals is needed to ensure optimal screening and diagnosis of skin cancer in Latin Americans and patients with darker skin tones (Schmerling et al., 2018). Frequent visual screening conducted by healthcare providers is one of the most effective strategies for early diagnosis of skin cancer. Nonetheless, there is still a lack of awareness among many healthcare professionals about effective screening and diagnosis techniques to employ for the target population. This results in deficient time spent on skin cancer prevention education and total-body screening examination in the primary care setting (Chung, Brown, and Gibson, 2015). Healthcare providers need to be educated and provided guidelines on how to conduct skin cancer screening and train their patients on self-surveillance and examination. This is because educated healthcare providers and patients are more likely to perform proper skin examination and identify suspicious lesions earlier (Chung, Brown, and Gibson, 2015).

Rationale

The rates, sensitivity, and specificity of skin cancer detection are always lower in Latin Americans and people with darker skin tones compared to whites (Howlander et al., 2019). A better understanding of skin cancer in people with darker skin tones among healthcare providers will likely result in earlier screening and diagnosis of skin cancer. Investigated reviews as part of the preparation of this systematic review failed to provide clear guidelines and recommendations that can educate health care providers on skin cancer. Most of the reviews identify general recommendations that cannot offer specialized education on the specific target population.

There is clearly a need for a systematic review that will consolidate all the available information on educational interventions for healthcare providers and how they can improve the screening and diagnosis of skin cancer in Latin Americans and other patients with darker skin tones. Addressing the disparities using evidence from the systematic review will have a positive impact on healthcare delivery and healthcare policy, nursing practice, nursing education and training, and research. For instance, an increase in nursing education on culturally appropriate care will equip healthcare providers and nurses for the target patient population with relevant knowledge to promote and support care delivery to Latin Americans and individuals with darker skin tones (Holland, 2017). The systematic review will also fill the knowledge gap that exists and develop a foundation for future researcher to investigate the topic of cancer in darker skin tones further.

Objective of the Review

The proposed systematic review aims to appraise the latest evidence that can be used to develop and support educational interventions for healthcare providers to promote early screening and diagnosis of skin cancer. This would result in the improvement of outcomes for people with darker skin tones. The proposed review will make use of studies that have been published in the past 5 years and will make use of studies that focus specifically on Latin Americans and other people with darker skin tones. The findings from this systematic review will be used to develop a quality improvement project. The project will be implemented in a healthcare facility and would include the education of healthcare providers with the aim of improving early screening and diagnosis of skin cancer in people with darker skin tones.

METHODOLOGY

Theory, Definitions, and Terminologies

The proposed systematic review aimed to determine the impact of educational interventions for healthcare providers on improving the screening and diagnosis of skin cancer for Latin Americans and other patients with dark skin tones. To this end, there are four important terminologies that should be explained. These are Latin Americans, patients with dark skin tones, healthcare providers and educational interventions. Latin Americans refer to members of ethnic groups that trace their roots to Spanish, French, and Portuguese speaking nations in Central and South America, Mexico, Haiti, the Caribbean, Puerto Rico, and Haiti (Larrain, 2014).

Patients with dark skin tones include individuals from other ethnicities other than Latin Americans that have darker skin tones. People with darker skin tones include populations inhabiting various continents and nationalities. Continents including the Americas, Africa, Asia, and Australia all have populations that have evolved darker skin tones as protection against harmful rays of the sun that are responsible for skin cancer. Most of these populations are located near the equator where there are higher amounts of UV radiation. On the contrary, people located in areas further away from the equator have people with lighter skin tones due to the lower concentration of UV radiation in those regions (Osborne and Hames, 2014).

Healthcare providers consist of a multidisciplinary team of individuals that are qualified by training, education, or licensure to perform professional health services within a specified scope of practice. Under federal regulations, healthcare providers are medical doctors or nursing practitioners, chiropractors, dentists, podiatrists, nurse midwives, or clinical social workers among other healthcare professionals that have the authority to practice by their State and perform within the scope of their practice (Wager, Lee, and Glaser, 2017). Education interventions are programs, curriculums, pedagogical techniques or curriculums that aim to improve human education and training (Bzowyckyj, Dow, and Knab, 2017). In the case of this systematic review, educational interventions refer to strategies that can be used to improve the knowledge of healthcare providers to promote early screening and diagnosis of skin cancer in Latin Americans and patients with darker skin tones.

Eligibility Criteria

An inclusion criterion was developed to ensure that only the most relevant articles to answering the PICO clinical question were included in the systematic review. One of the criteria was that the articles had to of low to moderate bias. This criterion was set to ensure that the highest quality of data was obtained. The other criterion was that the articles had to focus on the topics under study. These topics included the different educational strategies and interventions, format for delivery of educational interventions, and the monitoring and follow-up strategies.

The research articles also had to focus on Latin Americans and patients with darker skin tones as this was the target population for the systematic review. As described in the definition of terminologies, the target population included individuals from Latin nations and individuals from other continents around the world with dark skin tones. In addition to conforming to the target populations, the articles had to have been published in the past five years. This meant that only articles published from 2014 onwards were included in the review. This was necessary to ensure only the most current and relevant literature was used in the systematic review.

Several articles were excluded for failing to meet the eligibility and inclusion criteria set out for the systematic review during the initial and thorough screening process. An example of an article that was eliminated in the initial screening of titles and abstracts was Armstrong and Cust (2017). Just by reading the title of the research article, it was clear that the study focused on skin cancer in whites and not Latin Americans and people with darker skin tones. Lastly, the article by Gordon (2014) was eliminated after reading its' full text. Although the title and the abstract seemed to provide information that was consistent with the inclusion criteria, reading the full text revealed that the article provides general guidelines that were not specific to the target population of Latin Americans and patients with darker skin tones.

Information Sources

The databases that were used to obtain studies for inclusion in the systematic review were the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and the Medical Literature Analysis and Retrieval System Online (MEDLINE) databases. The databases provide various search limiters that were used to narrow down the search to the most relevant articles. The limiters used included restriction to articles that were available in full text, published in the English language, and articles published between 2014 and 2019.

Search Strategy

In order to evaluate the educational interventions for healthcare providers to improve screening and diagnosis of skin cancer in Latin Americans, keywords were developed to help obtain data from the relevant medical databases based on the outlined topics. The keywords used were Latin American, dark skin, skin cancer, educational interventions, and healthcare providers. The MeSH terms for these keywords were obtained and included Latino and Hispanic American for Latin Americans, African American for dark skin tone, and non-melanoma and melanoma skin cancer for the term skin cancer. These keywords and generated MeSH terms were developed into a string of search terms that enabled the faster acquisition of literature. The search term string was ((MH "Latin American*") OR Hispanic OR Latin* OR "dark* skin" OR

"African American) AND ((MH "skin cancer") OR *melanoma AND (("Education* intervention") AND (("healthcare provider*")).

The databases were searched using the initial search term string and a combination of the generated MeSH terms. Advanced search limiters were used in both databases to limit the search results to only the most relevant results. This included limiting the results to only systematic reviews and clinical guidelines and limiting the publication years between 2014 and 2019. Additionally, only articles that were in English and available in full-text were used for preliminary literature review.

Study Selection and Screening Process

The steps for selecting studies included application of the inclusion criteria to titles and abstracts, elimination of studies that do not meet multiple inclusion criteria, retrieval of full texts for the remaining studies, further evaluation of the remaining articles against the inclusion criteria, and finally the inclusion of the most relevant studies into the systematic review. The initial application of the inclusion criteria to titles and abstract help to eliminate a large number of studies that were not relevant to the PICO clinical question without having to read the entire article. Studies were then retrieved in full text for closer scrutiny and further evaluation on their relevance to the clinical question. Lastly, the author selected the articles that best answered the clinical question for inclusion in the systematic review.

The databases provided updated studies from all over the world that would be important for answering the PICO clinical question. The CINAHL database yielded 177 articles while the search in the MEDLINE database yielded 58 articles. The obtained articles covered a variety of topics related to screening and diagnosis of skin cancer in Latin Americans and other populations with dark skin tones. Some of the articles outlined the educational interventions that can be used to improve screening and diagnosis of skin cancer while others outlined the various strategies that could be used by healthcare providers to improve the effectiveness of screening and diagnosis of skin cancer in the primary care setting.

PRISMA Flow Diagram

The process of screening and selecting the research studies to include in the systematic review was mapped using the PRISMA flow diagram. Some of the information that was mapped includes the number of documents identified from individual databases, screening and eligibility testing process, and reasons for exclusion. See figure 1 below.

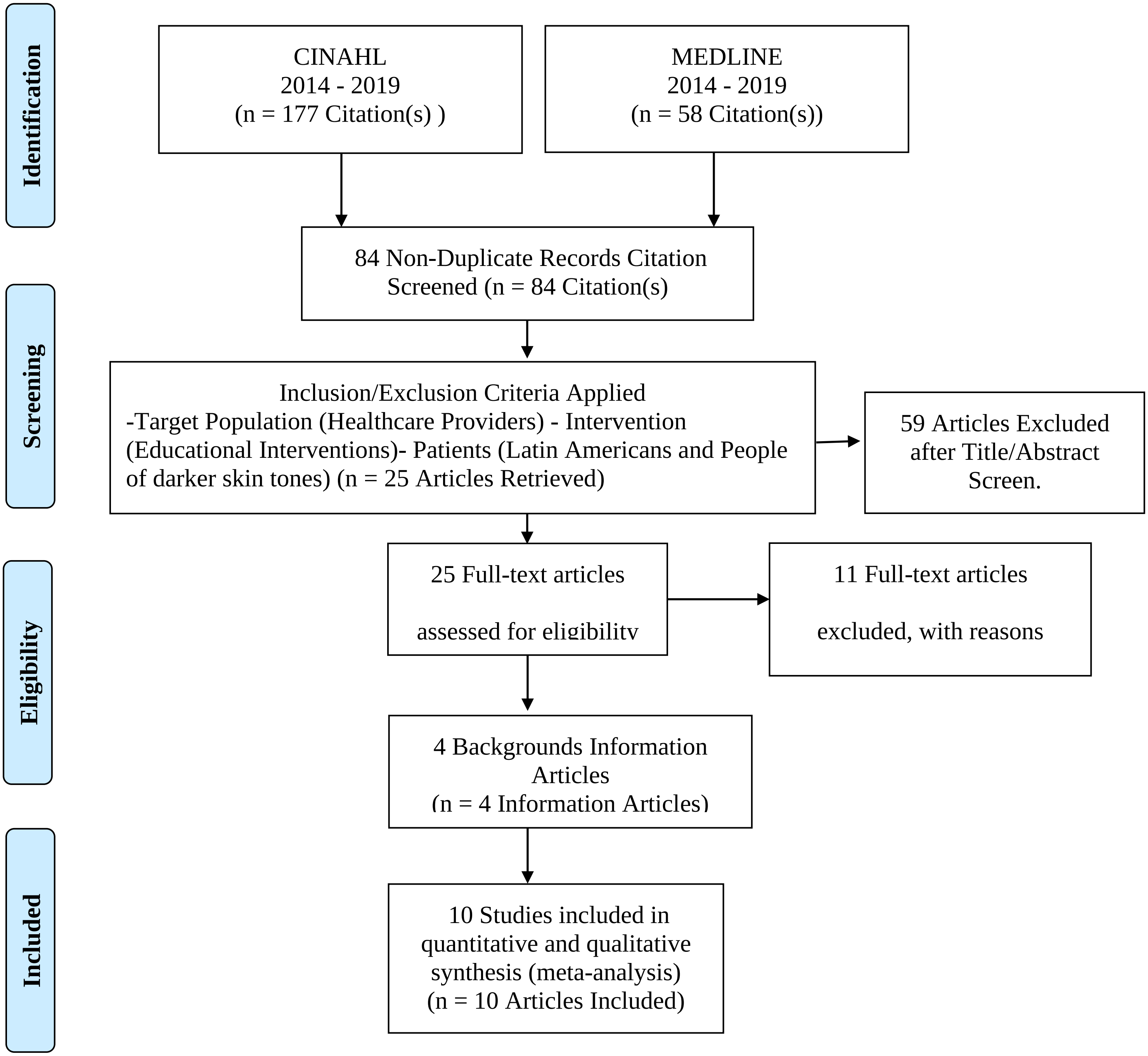

Figure 1: *PRISMA Flow Chart*

Data Collection Process

The collection of data from the included studies was personally done by the researcher. A data extraction form was developed specifically for this systematic review. The forms used included the various section for a collection of the study characteristics and the main data items of the in the studies. During the process of collecting data, the researcher constantly made references between the data collected from the different studies to determine the reliability of the findings. Preference was also given to studies with stronger significance when coming up with a conclusion on the general directions of the body of literature that was included in this systematic review.

Data Items

Early screening and diagnosis of skin cancer can improve the outcomes and mortality rates for patients. This is, however, not always the case with Latin Americans and people with darker skin tones as due to an atypical presentation which has the potential to hinder early diagnosis. These differences mean that healthcare providers require familiarization with skin cancer manifestation in this patient population in order to improve early detection capabilities. Educational interventions can be used to inform healthcare providers on the differences in manifestation and effective patient surveillance strategies to promote early detection (Higgins, Nazemi, Chow, and Wysong, 2018).

Some of the emerging topics for investigation relevant to the PICO clinical question include the different educational strategies and interventions, format for delivery of educational interventions, and the monitoring and follow-up strategies. Additionally, data items that were extracted from the research articles include nature of the intervention, outcome variables, the time period for the implementation, the methodological quality of the research studies, the cultural and linguistic range of interventions, epidemiology and etiology of skin cancer in people with darker skin tones, and finally the factors and characteristics that result in late diagnosis and poor prognosis. General data items were also collected. These include the study authors, the purpose of the study, methodology and research design, characteristics of participants and the setting of the study, interventions or measures addressed, the results, and the relevance of the results to the purpose of the review.

Methods of Risk of Bias Appraisal

All the ten studies included in the systematic review were appraised for their risk of bias. The ROBINS-I assessment tool was used to determine the risk of bias within and across studies. Some of the biases that can arise are overall bias, bias in the selection of reported results, bias due to confounding, bias in the measurement of outcomes, bias in participants' selection, bias in intervention classification, bias due to missing data, and bias due to deviation from intended interventions. The risk of bias according to the tool can either be low, moderate, serious, or critical (Sterne et al., 2016). In some cases, there can also be insufficient information to determine the risk of bias in a study as it was in two of the articles included in this systematic review. The results of the risk of bias appraisal for the studies are included in this systematic review as commentary and in a systematic narrative description in the results section.

RESULTS

The results chapter presents the information retrieved from the analyzed studies. It also includes sections that describe how the studies were selected, the characteristics of the included studies, and the findings from individual studies in the systematic review. The chapter also explores the risk of bias across the studies and the risk of bias within the studies.

Study Selection

The search in all the databases that were used for the systematic review led to the generation of 235 results with 177 from the CINAHL database and 58 from the MEDLINE database. After screening for duplicates, 84 articles were left. The remaining 84 articles were assessed for eligibility by reading their titles and abstracts and comparing to the inclusion and exclusion criteria described in the methodology section. With this initial screening, 59 articles were eliminated leaving 25 articles. The 25 articles were obtained in their full-texts in order to examine them more closely to select only the articles that were most appropriate to answer the clinical question of the systematic review.

The 25 articles were read in their entirety. A further 11 articles were excluded after this phase of screening. Four articles were found to be potential sources of background information for the systematic review. A total of 10 study articles were selected as the most relevant for the systematic review. The RefWorks resource was used to classify all the articles generated in the systematic review into three folders namely; irrelevant, relevant folder, and potential background information folder. There were ten articles in the "relevant articles" folder, seventy, in the "irrelevant articles folder" and four articles in the "potential background information articles" folder. The PRISMA flow diagram in the methodology section describes the study selection process that led to the selection of the 10 study articles that were included in the systematic review (*Figure 1: PRISMA flow diagram*).

Study Characteristics

This systematic review included ten study articles; Agbai et al. (2014), Chung, Brown, and Gibson (2015), Garnett, Townsend, Steele and Watson (2016), Harvey, Oldfield, Chen, and Eschbach (2016), Higgin, Nazemi, Chow, and Wysong (2018), Korta, Saggar, Wu, and Sanchez (2014), Loh, Ortiz, Goldenberg, and Jiang (2016), Perez (2019), Stubblefield and Kelly (2014), and Tripp et al. (2016). The studies were of different types including qualitative studies, quantitative studies, clinical reviews, a retrospective chart review, single centre survey study, a mixed-methods study and a community-based prevention trial. While most of the studies had no comparable control group, a majority compared skin cancer characteristics and factors between whites and people with darker skin tones. The research design and methodologies for the included studies are summarized in *Table 1: Summary of individual studies.*

The included studies were predominantly focused on Latin Americans (Agbai et al., 2014; Chung, Brown, and Gibson, 2015; Garnette et al., 2016; Harvey et al., 2016) with many of them additionally exploring skin cancer in other ethnicities and races such Blacks (Agbai et al., 2014; Higgins et al., 2018), Asians (Agbai et al., 2014; Loh et al., 2016; Higgins et al., 2018) and even Pacific Islanders and American Indians (Tripp et al. 2016). One of the studies (Stubblefield and Kelly, 2014) explored skin cancer in all non-white populations. The study by Tripp et al. (2016) also investigated melanoma in general while acknowledging the poor prognosis and delay in diagnosis of skin cancer in people with darker skin tones.

The 10 articles that were selected for inclusion covered a variety of topics relevant to the clinical question. The quality of the studies was an important consideration when drawing and compiling data from the included studies. Some of the studies had a large sample size (Garnett et al., 2016 with 6,623 participants and Loh et al., 2016 with 4,029 participants). Other had a relatively small sample size such as Chung, Brown, and Gibson (2015) which had 34 participants and thus reducing the quality of the studies. Some of the studies (Chung, Brown, and Gibson, 2015; Korta et al; 2014) were also carried out at a single centre or location which might reduce the applicability of their findings in the general target population.

Results of Individual Studies

A total of ten studies were found to be the most relevant to the systematic review. The study by Agbai et al. (2014) was conducted as qualitative research to review available information on skin cancer and photo-protection. The study also aimed to provided actionable guidelines on photo-protection, diagnosis, and management in skin cancer. The study targeted people of color including Blacks, Hispanics, and Asians. Some of the findings included the key physical presentation of cancer that healthcare providers should look for, anatomical distribution, the major risk factors for cancer, and the consideration of diversity and culture when addressing skin cancer in people with dark skin tones. Some of the recommendations for healthcare providers include thorough skin examinations, referral of patients as appropriate to dermatologists, educating patients on sun protection, and proper examination and monitoring of changes in pigmented lesions (Agbai et al., 2014).

Agbai et al. (2014) report that basal cell carcinoma shows many parallels among all races and skin colors. This is usually a solitary pearly papule with central ulceration and rolled borders. The characteristics of the condition are harder to spot in people of color. Concerning anatomical distribution, about 80% of basal cell carcinomas are found in the neck and head of people with color. The risks of squamous cell carcinoma in people of color include inflammatory processes such as thermal burns and chronic scarring. These factors are observed in 20 to 40 per cent of reported cases. Squamous cell carcinomas are characteristically firm superficial, well-demarcated plaques or papules that emerge from an indurated rounded, and elevated base. Among Blacks, squamous cell carcinoma the condition is mostly diagnosed in the lower limbs followed by the neck and head, and then the genitals (Agbai et al., 2014).

Malignant melanoma in individuals with darker skin tones usually appears in the leg for both black Americans and Hispanics. The authors found that most studies on malignant melanoma reported over half of the diagnosis were found to be on extremities especially the feet. The most common histological type in Blacks was acral lentiginous melanoma with superficial spreading melanoma being the most common in all other ethnicities. Malignant melanoma appears as a dark patch or macule and may have a history of spreading rapidly. Lastly, the study indicates that mycosis fungoides typically presents as hyperpigmented patches or erythema in individuals with dark skin tones. Hypopigmented mycosis fungoides is also almost exclusively diagnosed in people with dark skin tones as loosely defined hypopigmented patches. Its distribution is usually less acral and more central and mild pruritus is present in most cases. Multiple biopsies are recommended for the conditions and are necessary to confirm the diagnosis (Agbai et al., 2014).

The study by Higgins et al. (2018) also investigated the clinical features of skin cancer specifically for non-melanoma skin cancer. Additionally, it included the unique demographic factors that determine the feature of non-melanoma skin cancer and its appearance in patients of color. The researchers included numerous studies conducted between 1947 and 2017 which provided reliable information on non-melanoma skin cancer in people with dark skin tones including African Americans, Hispanics, and Asians. It was noted in the study that relative to Caucasians, non-melanoma skin cancer which comprises of basal cell carcinoma and squamous cell carcinoma has unique clinical characteristics and demographics in people with darker skin tones. The study provided several images that healthcare providers can use to identify the clinical features of skin cancer in people of color (Higgins et al., 2018).

Squamous cell carcinoma was described as the most common cutaneous malignancy in African Americans. Like in the study by Agbai et al. (2014), the risk factors for the development of squamous cell carcinoma were identified as chronic scarring, immunosuppression, and chronic exposure to ultraviolet radiation. Scarring accounted for 20% to 40% of cases. The condition also occurs more in non-sun exposed areas such as the anogenital region and lower legs in people with darker skin tones. In African Americans, squamous cell carcinoma appears as keratotic black or brown hyperpigmented plaques. According to the authors, the lesions may assume a nodular or papular appearance and sometimes there may be thinner hyperpigmented plaques and papules and cutaneous horns (Higgins et al., 2018).

According to Higgins et al. (2018) basal cell carcinoma has been predominantly studied in Caucasians although it presents in 12% to 35% of skin cancers in African Americans and other people with darker skin tones. Risk factors in people with darker skin tones include scars, chronic infections, albinism, ulcers, immunosuppression, and radiation treatment among others. According to the authors, people with darker skin tones require closer monitoring after diagnosis of basal cell carcinoma due to the propensity towards the development of metastasis. The appearance of the disease in people of color includes pigmentation in over 50% of tumors compared to 5% to 6% in Caucasians. Moroheaform basal cell carcinoma in patients with dark skin tones appears as porcelain-colored plaque on the neck and head with indurated, depressed or flat, shiny, smooth, and indistinct borders (Higgins et al., 2018).

On the other hand, the study by Loh et al. (2016) mainly provides healthcare providers with recommendations on the locations to focus on when screening people with darker skin tones. The study was conducted in the form of a 5-year retrospective chart review of data for Mohs Micrographic Surgery (MMS) cases. The authors noted that the majority of non-melanoma skin cancers are usually in zone 1 for all races. Nonetheless, more cases were noted in Zone 1, which includes the central facial structures, in Hispanics than in whites. Hispanics were found to have the least number of lesion ins zone 2 while Asians had no lesions in zone 3. Hispanic and Asian women are also at a higher risk of developing non-melanoma skin cancers and thus necessitating the development of preventive and screening guidelines targeting this population. One of the limitations of the study included the small sample size of Hispanics and Asians making the comparison with the larger sample size of whites difficult. The study was also conducted in a single-centre which may not be representative of populations across the United States (Loh et al., 2016).

It was also important to note that the study by Loh et al. (2016) reported a higher proportion of pigmented basal cell carcinoma in Asians followed by Hispanics and finally whites in the collected data. Asians had the highest occurrence of nodular and micro-nodular basal cell carcinoma tumors. Therefore, it is important to consider basal cell carcinoma in the differential diagnosis in patients of the Asian race. This is because although it was rare in the general population, it was noted to be common in Asians. The authors also reported that there are often numerous melanin granules in tumor cells with hyperpigmentation being the most distinguishing feature of pigmented basal cell carcinoma. The diagnosis of squamous cell carcinoma in situ/

Bowen was found to be higher in Hispanics and Asians than in whites. This indicates the importance of considering the prognostic and clinical characteristics of the condition when making a differential diagnosis of the squamous cell carcinoma in people with darker skin tones (Loh et al., 2016).

The other relevant study by Chung, Brown and Gibson (2015) only included Hispanic participants unlike the studies by Agbai et al. (2014) and Loh et al. (2016) which included whites and other individuals with dark skin tones. Patient education is an important consideration in promoting early detection and diagnosis of skin cancer. The study sought to investigate the effectiveness of educational interventions provided by healthcare providers for Hispanics on risk-factors and self-monitoring for skin cancer. A total of 34 participants were included in the community-based prevention trial. In order to record the effectiveness of the intervention, awareness, self-efficacy, and knowledge were tested before and after the intervention. The intervention consisted of 10 to 15-minute sessions for small groups of three to four who were educated on the identification of common melanoma risk factors, self-screening, identification of atypical moles and melanomas from photographs, and the use of the ABCDE rule for surveillance and screening (Chung, Brown, and Gibson, 2015).

The results of the study suggest that Hispanics/Latinos who are at a low socioeconomic stratum may be at a moderate to high risk of developing melanoma. The factors identified as deterring early access to healthcare include low annual incomes and lower levels of education. The results suggest that up to 44.1% had performed skin self-examination for moles but 40% of them performed screening only once or twice a year. Only 23.5% had discussed skin surveillance with their healthcare personnel while 17.6% were educated on regular skin examination by their healthcare providers. Posttest analysis of the interventions suggested that educational interventions led by healthcare providers significantly improved the awareness and knowledge of melanoma including self-efficacy and self-surveillance. Media was the recommended mode of education due to the access to televisions and radio. The authors noted that having the media in Hispanic and involving social institutions was a culturally competent means of delivering health education (Chung, Brown, and Gibson, 2015).

The study by Korta et al. (2014) also sought to evaluate skin cancer surveillance awareness and behavior. However, the study population included both whites and minority groups with darker skin tones such as Hispanics, Blacks, Asians, and others. Unlike the study by Chung, Brown, and Gibson (2015), this study was able to compare results in relation to race and besides other factors such as insurance status, gender, and previous cancer diagnosis. A total of 152 participants were included in the study. The study noted that participants had poor ability to recognize features that lead to suspicion of melanoma. Minorities, especially Hispanics performed worst in their ability to recognize these feature (Korta et al., 2014).

In all the participants, only 16% had had a total body scan for cancer with minorities having lower rates of total body scans. A lower percentage (11%) had been educated on how to perform self-examination compared to 17.6% in the study by Chung, Brown, and Gibson (2015). Only 15% of the participants partook in skin self-examination. Additionally, only 33% of patients with a prior diagnosis of skin cancer performed self-examinations. These results pointed to the need for improved patient education of skin cancer especially for individuals with darker skin tones. This is because they showed lower accuracy in the scoring of questions on the characteristics of melanoma. For instance, only 7% of Hispanics answered correctly only the asymmetrical appearance of melanoma compared to 50% of whites. One limitation of the study was the small sample size which made it difficult to make better comparisons on racial differences for skin cancer diagnosis in the patients (Korta et al., 2014).

Another body of included studies included the epidemiology, etiology, recommendations of interventions, and the outcomes of the interventions (Tripp et al. ,2016; Garnett et al., 2016; Stubblefield and Kelly, 2014). The study by Tripp et al. (2016) outlined the epidemiology of both Melanoma and nonmelanoma skin cancer. The study was unique compared to the other studies above since it included more sub-groups such as American Indians and Pacific Islanders who have darker skin tones but have not been addressed in the other studies. The study acknowledges that Blacks and Hispanic with darker skin tones generally have a cancer diagnosis in late stages which leads to a poorer prognosis. The study also indicated that melanoma cases cause nearly 75% of skin cancer deaths and that the average cost of melanoma treatment had increased by 288% compared to 25% for all other types of cancer. Barriers to early full-body screening and detection by clinicians include patient embarrassment, competing comorbidities, and time constraints. Factors that improve examination include demand for a complete examination by the patient, mole checks and appropriate training of healthcare providers (Tripp et al., 2016).

Prevention of melanoma and early detection are lauded as the best strategies to reduce the burden associated with the condition. With regards to prevention, avoidance of indoor tanning and sun protection are explored with discussion on the United States Preventive Services Task Force (USPSTF) recommendations on skin cancer screening and counselling. Besides education on screening, individuals should be educated to wear protective clothing, limiting time outdoor during mid-day hours when ultraviolet radiation is high, wearing sunscreen and sunglasses, and avoiding indoor tanning. Multi-component community-based interventions such as those directed towards mass media campaigns, individuals, and policy changes are also shown in the study to have positive impacts on preventive behavior and screening practices. For healthcare providers, early detection requires proper skin examination and screening. Melanomas detected by clinicians are usually thinner with a mean of about 0.55mm less when compared to those identified by the patient or family members. The study suggests that healthcare providers can use INFORMED (INternet-based program FOR Melanoma Early Detection) to learn how to screen potential skin cancer patients and educate them on self-examination to promote early detection and diagnosis (Tripp et al., 2016).

Garnett et al. (2016) also investigate the epidemiology of melanoma specifically on Hispanics using population-based cancer incidence data from the National Program of Cancer Registries and Surveillance, Epidemiology and End Results Program. The study had 6,623 which was comparatively higher than that of some of the other studies included in the study. The researchers categorized the results by race, age at diagnosis, staging, anatomical location, and histological grouping as either melanoma not otherwise specified (NOS), acral lentiginous melanoma (ALM), nodular melanoma (NM), lentigo malignant melanoma (LMM), and superficial spreading melanoma (SSM). The outcomes are outlined in *Table 1.* With regards to anatomical location, melanoma was recorded as being most common on the hip and legs among Hispanic females and on the trunk in males. This is different from the findings in the previous studies which generally noted more cases in lower extremities (Garnett et al., 2016).

Like Garnet et al. (2016), the study by Stubblefield and Kelly (2014) also explore the epidemiology of skin cancer. However, it focuses on all none Caucasian populations in the United States. Addition it also explores the etiology and the outcome of specific interventions to improve the screening and diagnosis of skin cancer. An interesting finding in the study is that individual with darker skin tones present with higher incidences of acral lentiginous melanoma in non-sun-exposed areas such as the soles, palms, and subungual sites. In several sites references in the study, it was found a higher proportion of lower-extremities lesions and acral lentiginous melanoma. Acral melanoma can present as a chronic wound or melanonychia of the nail. It is characterized by the acral distribution of lesions on extremities. Clinical presentation of acral lentiginous melanoma can be confirmed using dermoscopy. Histological presentation is usually in the form of confluent dendritic melanocytes, both nests and singly that run along the dermal-epidermal junction with a varying number migrations by pagetoid upwards (Stubblefield and Kelly, 2014).

Concerning the etiology of melanoma in people with darker skin tones, risk factors such as male gender, older age, and lighter-skinned phenotypes are noted as being contributing factors (Stubblefield and Kelly, 2014). Promoting increased awareness among patients and health care providers can help reduce the disparity in melanoma outcomes between ethnic groups (Garnet et al., 2016). Some of the suggested interventions to reduce disparities in outcomes include encouraging individuals to visit physicians, education self-examination and when to visit healthcare providers. The provision of free skin clinics was also shown to increase the prevalence of screening by up to 23% in the first two years and 8% in five years after the initiation of the intervention. Education about the ABCD (asymmetry, border irregularity, color, variegation, and diameter) method of education and screening increase skin examination especially in acral areas from 18.7% to 85% immediately after education and 67.6% three months later (Stubblefield and Kelly, 2014).

Contrary to all the other studies, the study by Perez (2019) only focused on the factors that lead to late diagnosis of skin cancer in Hispanics. The authors also compared results on the prognosis of skin cancer for Hispanics of lower and those of higher socioeconomic statuses. Some of the measures in the study were sun-safe behaviors, tumor sizes, metastasis, awareness of risks and symptoms, and access to health insurance. The study found that lower socioeconomic status is associated with delays in melanoma diagnosis by physicians. The delays were due to several factors including lack of knowledge, language barriers, and lack of access to health insurance (15% of Hispanics) which leads to delays in seeking healthcare. The study also noted that Hispanics are younger at diagnosis, have thicker tumors (over 1 mm, 35% to 25%), distant metastasis (7% to 4%), regional involvement (12% to 8%), and worse survival rates compared to whites (Perez, 2019).

Lastly, the study by Harvey et al. (2016) sought to investigate the use of a social-ecological model as a framework to investigate the multitude of influences and disparities of cutaneous melanoma in Hispanics. The model was divided into four different sections including individual factors, interpersonal factors, community factors, and societal/policy factors. Individual factors are similar to those identifies in other studies including race, age, insurance status, behavior, and the knowledge, beliefs, and perceptions. Interpersonal factors included English fluency and peer and family influence while community factors include workplace environment and exposures, and neighbourhood measures. Finally, the societal factors were healthcare infrastructure, media and health communication efforts, health policy and public laws, and medical workforce diversity. The study provides insight into some of the important factors that should be considered when developing interventions to improve the screening and diagnosis of skin cancer in people of color (Harvey et al., 2016).

Harvey et al. (2016) also provide recommendations that can be used to plan future studies and interventions in each of the main topics in the social-ecological model. Under the individual, the authors recommended the identification of biomarkers for skin cancer progression, identification of risk factors, and increased recruitment of Hispanics into educational interventions. Under interpersonal factors, the authors suggested the inclusion of Hispanic stakeholders when developing community-based programs. The study suggested an increase in studies to investigate unique environmental factors besides UV-radiation that increase the risk of skin cancer in Hispanics in the community setting. Lastly, under societal/policy level of influence, the authors suggested the training of physicians on the screening for skin cancer, diversification of dermatologic and medical workforce to increase the representation of people of color, implementation of policies to remove barriers to access to specialty and primary care, and the development of linguistically and culturally appropriate educational campaigns that target the relevant subgroups (Harvey et al., 2016).

Table 1: *Summary of individual studies*

Author	**Purpose**	**Methodology/ Research Design**	**Participants Characteristics Sampling/Setting**	**Intervention/Intervention Fidelity/Measures**	**Results**	**Relevance to Review Purpose**
Agbai et al. (2014)	- Review of information on skin cancer and photoprotection in people of color - Presentation of actionable recommendations for physicians and the public for photoprotection and skin cancer diagnosis and management.	- Qualitative research - No comparative control group	- The target population included Blacks, Hispanics and Asians who make up the target population for the systematic review of people with dark skin tones.	- Review and recommendations for physicians and the public on skin cancer and photo-protection in people of color. - Key physical presentations healthcare providers should look for when diagnosing different skin cancers in people of color. - The anatomical distribution and major risk factors are also provided to help healthcare provider screen and diagnose skin cancer - Healthcare providers should also take into consideration the diversity language, culture, and belied across different populations when addressing the issue of photo-protection so as to make the greatest	The recommendation for physicians are; - Education of patients - Thorough skin examinations - Proper monitoring of changes in pigmented lesions - Advice patients on vitamin D supplementation as indicated - Referral of patients to dermatologists as appropriate The recommendations for people with dark skin tones were; - Use sun-protective clothing and wear - Avoid staying unnecessarily long in the sun - Use sunscreen before going outdoors - Use broad-spectrum sunscreen with a sun-protection factor of 30 or greater - Take vitamin D supplements - Perform regular self-examination	- Primary care physicians and other healthcare providers should be educated on interventions to improve the screening and diagnosis of skin cancer in people with darker skin tones. - The study provides recommendations on some of the strategies that healthcare providers can use. - It also provides recommendations for people with dark skin tones. Healthcare providers can use this information as a basis for the development of a patients' education program to improve the screening, diagnosis, monitoring, and follow-up for skin cancer in people with

				impact in people of color.		darker skin tones
Chung, Brown, and Gibson (2015)	- To delineate important lessons on the effectiveness of an educational project led by healthcare workers that aimed to provide educational interventions to Hispanics/Latinos on the risk factors and self-monitoring of melanoma. - The authors also tested the awareness, knowledge, and self-efficacy after the intervention.	- Community-based prevention trial - Bilingual lay healthcare workers led 10 to 15 minutes of education sessions for groups of 3 to 4 participants - The workers received 8 hours of training prior to the intervention - Pretest and posttest intervention comparisons were done to determine the impact of the educational intervention	- Participants: 34 - Setting: Self-selected sample of attendants at a community health fair. - Eligibility: Be non-white, Hispanic/Latino, over the age of 18, and living within the study area. - Characteristics: Moderate to high risk for melanoma (70.6%), earned less than $30,000 annually (76.5%), no high school diploma (35.5%), Access to care with health insurance (50%), occupational skin exposure (41.2%), skin self-examination (44.1%), discussion on skin surveillance with healthcare provider (23.5%), learnt to perform	Objectives of the educations interventions include; - Enable participants to identify common melanoma risk factors - Discussion on photos of atypical moles and melanomas - Demonstration of self-screening skin examination - Description of ABCDE rule for melanoma surveillance as contained in the 2013 versions of the American Cancer Society and the American Academy of Dermatology guidelines At the end of sessions, participants could ask questions and asses their own moles with a national board-certified dermatologist	- Posttest data showed that there was a significantly substantial improvement in the general knowledge, self-efficacy, self-surveillance, and awareness of melanoma in people with darker skin tones - Many individuals with dark skin tones are at moderate to high risk of developing skin cancers. - Presence of risk factors such as low socioeconomic factors, low levels of education, and lack of access to healthcare increase the risk of cancer in these groups - Healthcare providers can help to reduce modifiable risk factors such as by advising clients to avoid excessive occupational exposure to the sun and training them on self-screening skin examination	- The study identifies the presence of factors and issues that contribute to an increased risk of developing skin cancer and decreased early diagnosis of the condition in people with darker skin tone - The lessons learned can help to inform future efforts to develop an educational intervention for healthcare providers to improve the screening and diagnosis of skin cancer in Latin Americans with moderate to high risk of developing skin cancer.

			regular skin examination from healthcare provider (17.6%)			
Garnett, Townsend, Steele and Watson (2016)	- To investigate the epidemiology of melanoma among Hispanics in the USA - Included in the study were incidence rates and trends among Hispanics by age, race, sex, histology, stage, tumor thickness, and anatomic location	- Quantitative study - Population-based data on cancer incident rates obtained from the National Program of Cancer Registries, and Surveillance, Epidemiology and End Results Program	- Participants: 6, 623 - The analysis was limited to cases diagnosed among patients of Hispanic ethnicity regardless of race - Melanoma incidence data were limited to invasive microscopically confirmed melanoma cases - Data source covers 99.1% of the United States population of Hispanics - Characteristics: median age for diagnosis (56), melanoma not otherwise specified or other (61%), melanoma incidence rate for Hispanics from 2008 to 2012 (4.2 per 100,000).	- Cases were categorized by age at diagnosis, sex, and race (white, non-white, unknown) - Anatomical locations were categorized as ears and face, shoulder and upper limb, head and neck, hip and lower limb, and overlapping - Cancer staging was categorized as either unstaged, distant, regional, or local. - Histological groupings were; melanoma not otherwise specified (NOS), acral lentiginous melanoma (ALM), nodular melanoma (NM), lentigo malignant melanoma (LMM), and superficial spreading melanoma (SSM)	- 61% of melanoma cases were classified as Melanoma NOS or other - SSM was 23%, NM (9%), ALM (5%), and LLM (3%) - Anatomical location: Melanoma most common on hip and hip among Hispanic females and on the trunk among males - Higher incidences of melanomas on trunk found in younger ages - The proportion of melanoma on neck and head increased with age - Males and females had similar rates of localized melanoma - Males had higher rates diagnosed at regional and distant stage than females - Half of all melanoma diagnosis was thin tumors (n=2,717) - Thicker tumors were diagnosed among Hispanic males than among females	- It is important for public healthcare practitioners and clinicians to understand the presentation of melanoma among Hispanics in order to improve the chances of early detection, treatment, and survival - This study provides invaluable information on the epidemiology of skin cancer in people with dark skin tones that can be used in the education of healthcare providers on skin cancer screening and diagnosis in the study population

Harvey, Oldfield, Chen and Eschbach (2016)	- Use of a social-ecological model as a framework to investigate the multitude of influences disparities of cutaneous melanoma in Hispanics - The study also outlines recommendations that can be used to plan future interventions and studies	- Mixed methods study - A framework is used to investigate the reasons for poor melanoma outcomes in Hispanics - The social-ecological model includes sections for community, interpersonal, society/policy, and finally individual determinants - The available literature is used to elucidate these determinants on skin cancer in people with darker skin tones	- The target population was Hispanics who experience worse skin cancer outcomes than non-Hispanic whites - Lack of knowledge and awareness, differences in tumor biology, and the lower rates of self-examination and physician performed skin examinations are some of the factors for late presentation of cutaneous melanoma	Some determinants of late presentation of melanoma in the target population included; - Individual determinants; - Interpersonal determinants - Community determinants - Society and policy determinants The study outlined the measures for each of these determinants	- Individual determinants included; age, gender, race, genetic factors, immigration status, education, income, and occupation - The interpersonal determinants include fluency in the English language, cohesion, degree of assimilation, social networks, residence in a predominantly Hispanic neighborhood, and peer and family influence - Community determinants determined by the study were poverty levels, childcare availability and schools, workplace exposures and environment, and the built environment - Lastly, societal/policy determinants were racism and discrimination, societal norms, Hispanic medical workforce diversity, and media and health communication efforts	- The study shows that inequality in skin cancer outcomes among people of color occurs as a result of several factors and determinants - Understanding the many determinants of melanoma presentation and outcomes can help develop research designs and interventions that can educate healthcare providers on providing care for people with darker skin tones
Higgin, Nazemi, Chow, and	- Detail the unique demographic and clinical	- Clinical review - The authors investigated	- The study included information from 45 clinical studies on non-melanoma skin	- The study presented the clinical feature and demographic characteristics of	- The study includes several images that can be used by healthcare providers to understand the atypical	- The study provides a basis for healthcare providers to understand the

Wysong (2018)	features of non-melanoma skin cancer in patients with skin of color (African Americans, Asians, and Hispanics)	study results on skin non-melanoma skin cancer (NMSC) spanning from 1947 to 2017	cancer - The target population was people with dark skin tones including Hispanics, African Americans, and Asian patients - Studies not related to other forms of skin cancer other than non-melanoma skin cancer were excluded - The studies also had to contain unique clinical features of demographics of skin cancer in people of color	squamous cell carcinoma (SSC) and basal cell carcinoma (BSC) in people of color	presentation of melanoma in people of color - Melanoma has unique anatomical distribution and clinical features relative to Caucasians which are described in detail in the study - Presence of lesions due to chronic inflammation or scarring increases the risk of developing skin cancer in people of color - In people of color, melanoma occurs predominantly in non-son exposed areas compared to photo-distribution in most Caucasians	different clinical presentation of skin cancer in people of color as compared to Caucasians - The outlined differences and the detailed images of cancer presentation can be used to educate healthcare providers on patient surveillance and education to improve early screening and diagnosis
Korta, Saggar, Wu, and Sanchez (2014)	- Evaluate skin cancer surveillance awareness and behavior among patients attending a dermatology clinic at a public hospital	- Single-centre survey study - The study had no comparative control group but compared results within the included subgroups	- Participants: 152 - Setting: Dermatology clinic in New York - Characteristics: The study population included both whites and minority subgroups such as Hispanics, Asians, Blacks, and others.	- The study investigated skin cancer surveillance practices and skin cancer awareness - The study compared the study results in relation to race and by other factors such as gender, previous cancer diagnosis, and insurance status	- Dermatologist-diagnosed melanomas more often present on the chest, back, and legs, whereas patient identified lesions are more likely to occur on the face, neck, and scalp - A significantly greater percentage of white patients had a TBSE performed by a physician compared with minorities (49% vs 5%	- The findings from the study provide a good comparison of racial differences in terms of skin cancer screening and diagnosis in people with dark skin tones - Skin cancer knowledge and rates of body skin examination are low

					- Patients possessed a poor ability to recognize features suspicious for melanoma, with minorities (especially Hispanics) performing worse than whites	among people with dark skin tones - This points to the need for increased efforts towards the education of people with dark skin tones and their healthcare providers to improve skin cancer screening and diagnosis
Loh, Ortiz, Goldenberg, and Jiang (2016)	- Assess the differences in non-melanoma skin cancer prevalence, clinical presentation, and risk factors among Hispanic, Asian, and white populations at the University of California San Diego Dermatologic and Mohs Micrographic Surgery	- Single-Institution 5 year retrospective chart review - Data were collected from electronic medical records with confirmation by paper records of cases for procedures before 2008 - All MMS cases with a biopsy confirmed diagnosis of basal cell	- Participants: 4,029 - Setting: University of California San Diego Dermatologic and Mohs Micrographic Surgery Center (MMS) - Eligibility: Included patients of white, Hispanic, or Asian descent. Those that did not self identify or fell in a race other than the three were excluded - Characteristics: White 3881 (96.3%), Hispanic 115 (2.9%), Asians (0.8%).	- Measures that were included in the study were; patient age, lesion location, sex, pre-operation size, post-operation size, and the number of Mohs stages required for excision - Lesion location was divided into 3 zones - A lesion with an aggressive subclinical extension (ASE) was defined as tumors that required 3 or more Mohs stages for excision and had a final surgical margin of 10 nm	- Compared to whites, Asians and Hispanic have significant differences in clinical presentation and risk factors for NMSCs -Hispanics and Asians had higher rates of lesions in Zone 1 which includes the central facial structures compared to whites - Hispanics have the least number of lesions in Zone 2 and no Asian had tumors in zone 3 - Asians had the most nodular and micronodular BCC tumors - Although rare in the general population, pigmented BCC should be an important consideration in the differential diagnosis of	- The findings impact the approach that should be used by healthcare providers in the screening and diagnosis of NMSCs - The results also help to better classify NMSC presentation and clinical characteristics in Hispanics and Asians

	Center.	carcinoma or squamous cell carcinoma at the facility were included between March 2207 and February 2012.			tumors in Asians - A diagnosis of SCC-IS/Bowen was much more common in the non-white groups compared to the whites	
Perez (2019)	- To determine the factors to result in a late-stage diagnosis and poor prognosis of skin cancer in Hispanics	- Qualitative study - The authors compared the skin cancer factors in Hispanics of lower socioeconomic status (SES) and other groups of higher socioeconomic status	- The target population was the Hispanic population in the US - The conditions under review were NMSC and MM	Measures included; - Sun-safe behaviors - Access to health insurance - Awareness of risks and symptoms - Age and diagnosis - Size of tumors - Metastasis - Regional involvement	- Low SES factors increase the physician delays in melanoma diagnosis compared with individuals of higher-SES - Differences are likely due to lack of knowledge and access to health institutions, and language barrier - Increased acculturations lead many Hispanics to decline sun-sage behaviors - More than 15% of Hispanics lack access to health insurance which causes delays in seeking treatment - Hispanics also have less awareness of symptoms and risks thus resulting in the lack of culturally and linguistically targeted screening efforts - Hispanics are younger at diagnosis, have thicker tumors (over 1 mm, 35%	- Increased awareness of skin cancer, its prevention and diagnosis can help healthcare providers and patients in decreasing incidences, improving time of diagnosis, and improving outcomes among people with dark skin tones - Current recommendations only include fair-skinned individuals thus pointing to the need for guidelines to guide healthcare providers on skin cancer screening, diagnosis, treatment, and follow-up in people with darker

					to25%), distant metastasis (7% to 4%), regional involvement (12% to 8%), and worse survival rates compared to whites	skin tones
Stubble field and Kelly (2014)	- To describe the epidemiology, etiology, outcomes, and interventions for skin cancer in the non-Caucasian population	- Qualitative study - The authors made use of literature on skin cancer in non-Caucasian ethnic groups who tend to have more advanced disease at the time of initial diagnosis	- The target population was all non-Caucasian populations - These included African Americans, Asian, and Hispanic some of who are considered to have darker skin tones	The measured explored include; - Screening techniques - Awareness of differences in presentation of melanoma between whites and non-Caucasians - Etiology; anatomy, clinical presentation, histological type, and stage at diagnosis - Etiology; subtype, UV radiation, genetics - Outcomes - Interventions	- Acral lentiginous melanoma has specific genetic alterations in genes such as KIT, NRAS, and cyclin D1 - Non-Caucasian populations have a higher incidence of the acral lentiginous subtype of melanoma, which is seen on non–sun-exposed areas such as the palms, soles, and subungual sites - Research investigating better disease education and screening techniques has found promising results for addressing the disparities in melanoma among ethnic groups	- Promoting increased awareness among patients and health care providers can help reduce the disparity in melanoma outcomes between ethnic groups - Education is critical to teach both healthcare providers on how so check for lesions in sun-protected areas in people with darker skin tones - Techniques such as the ABCD methods can provide healthcare providers and patients with a guide to check skin lesions for border irregularity, asymmetry, color variegation, and diameters in order to improve detection and

						early diagnosis of skin cancer in non-white population
Tripp et al. (2016)	- To determine the state of science on the epidemiology of melanoma and non-melanoma skin cancers, their financial and social costs, prevention and early detection, and areas of scientific uncertainty and ongoing debate - The study includes recommendations for various groups such as clinicians and organizations	- Qualitative study - The authors made use of available literature, policy papers, and recommendations from organizations involved in skin cancer such as the American Cancer Society, the American Academy of Dermatology, the National Council on Skin Cancer Prevention, and the National Council of Skin Cancer Prevention and	- The study investigated melanoma in general but acknowledges that Black and Hispanic patient with darker skin tones are generally diagnosed with melanoma later in stages and with poorer prognosis - The investigated races were whites, blacks, American Indians, Asians/Pacific Islanders, and Hispanics - The statistics used were on melanoma incidences and mortality rates in the United States between 2008 and 2012	- Categories used to analyze the data included; age, sex, race/ethnicity, and - Other factors explored were financial and social costs, epidemiology of melanoma and non-melanoma skin cancers, and the prevention and early screening and diagnosis of skin cancer - Melanoma prevention recommendations for clinicians	- Melanoma causes nearly 75% of skin cancer deaths - Overall skin cancer treatment costs $8.1 billion yearly in the United States - Prevention interventions can decrease melanoma-related costs by approximately $250 million per year - Melanoma survival is strongly associated with stage at diagnosis; individuals diagnosed at a later stage have poorer survival - Melanoma prevention strategies include reduction of UV exposure and avoidance of indoor tanning - Recommendation for clinicians include promoting skin self-examination, implementing population-based screening, and clinician skin examination - Melanomas detected by clinicians through directed skin examinations or during the course of routine physical examinations (i.e,	- The study provides valuable information that can be used to reduce the burden of melanoma in the United States and beyond - Information that can help to promote early screening and diagnosis of melanoma include the recommendations for healthcare providers and organization and the outlining of various guidelines such as the INFORMED program that can be used to educate healthcare providers to promote early detection of skin cancers in people of all races regardless of their color

	to promote early screening and detection	Society of Behavioral Medicine among others			“opportunistic screening”) are thinner than those found by patients or their significant others - Time constraints, competing comorbidities, and patient embarrassment were the top 3 barriers to performing whole-body skin examinations - Factors that facilitated examination by physicians included having more patients at high risk for skin cancer, patient demand for a complete examination or mole check, and appropriate training - The INFORMED (INternet-based program FOR Melanoma Early Detection) can be used by healthcare providers as clinical guidance for early detection of melanoma and other common skin cancer	

Risk of Bias Within and Across Studies

The ROBINS-I assessment tool was used to determine the risk of bias within and across studies included in the systematic review. All but two articles included in the systematic review had a moderate risk of bias. This was because none of the studies was comparable to well-performed randomized control trials. The risk of bias was unclear for the two studies (Stubblefield and Kelly, 2014; Perez, 2019) since the authors did not provide sufficient methodological explanation on the studies. It was also clear that two of the included studies (Garnett et al., 2016; Loh et al., 2016) included a large sample size. This reduces the risks of bias since larger sample sizes provide a better representation of the population.

The risk of bias across studies was determined to be moderate to serious. This resulted from potential biases in the reported outcomes in the studies arising from biases in the classification of interventions and bias in the selection of reported results. There is a lack of sufficient literature on skin cancer in people with darker skin tones. The authors of the studies were therefore limited to the number of studies that they could consult when conducting their studies. Furthermore, they concentrated on studies that provided positive reinforcement of issues in the diagnosis of skin cancer in people with darker skin tones while ignoring negative findings and outcomes that might have threatened the measurement of variable yielding data that was valid to their research questions.

DISCUSSION

The discussion chapter provides a summary of the evidence as collected from the included studies, the limitations of the systematic review in general, and the conclusion to the systematic review.

Summary of the Evidence

The author settled on ten articles as the most relevant to answering the PICO research questions. The articles had good heterogeneity due to their differences in study designs, suggested interventions, expected outcomes, and the individuals and institutions involved in the studies. The study designs included qualitative and quantitative studies (Agbai et al., 2014; Garnet et al., 2016; Perez, 2019; Stubblefield and Kelly, 2014; Tripp et al., 2016), a community-based prevention trial (Chung, Brown, and Gibson, 2015), a mixed-methods study (Harvey et al., 2016), a survey study (Korta et al., 2014), a retrospective chart review (Loh et al., 2016), and a clinical review (Higgins et al., 2018). The studies were determined to be of moderate quality since none of the studies were a randomized control trial that could be termed as of the highest quality. Taken collectively, the included studies investigated a variety of topics related to educational interventions for healthcare providers to promote the early diagnosis and screening of skin cancer in people with dark skin tones.

Some of the areas that were explored in the studies including the epidemiology and etiology of skin cancer, recommendations for healthcare providers to promote early screening and diagnosis of skin cancer, patient education and education to improve detection and screening, and factors leading to late diagnosis of skin cancer in people with darker skin tones (Garnett et al., 2016; Higgins et al., 2018; Loh et al., 2016). All the included studies targeted people with darker skin tones although some used white participants and data from whites in order to make comparisons with that from people of color. By limiting the focus of the included studies on people with darker skin tones, the systematic review was able to stay relevant to its objectives. Overall, the investigated studies acknowledged that the education of healthcare providers can significantly promote early diagnosis and improve skin cancer outcomes in people with darker skin tones.

The factors that healthcare providers should take into consideration when investigating skin cancer in people of color can be summarized as the sizes, appearance, anatomical locations, and commonality of skin cancer subtypes which were extensively explored in the results section. For instance, there is a higher rate of acral lentiginous melanoma in people of color which is often seen in non-exposed areas (Stubblefield and Kelly, 2014). This means that healthcare providers should put higher suspicion of the most prevalent skin cancers for people with darker skin tones when making differential diagnoses of skin cancer. The findings from the studies will play a critical role in the development of a quality improvement plan to promote the education of healthcare providers. To further help in the identification of skin cancers in people with darker skin tone, two of the studies provided colored images of different appearances of skin cancers. There is a need for the development of a database of skin cancer images in people of color. This would be easy for healthcare providers to learn about the characteristics to look for when performing skin examination for skin cancers.

The results of the included studies provide several recommendations of interventions to promote early screening and diagnosis of skin cancer. Actionable guidelines on prevention, diagnosis, and management of skin cancer are explored in further detail in the result of the systematic review. For instance, the performance of thorough skin examination, the referral of patients as appropriate to dermatologists, and proper monitoring of changes in pigmented lesion are some of the roles healthcare providers can play in improving skin cancer prognosis in people with darker skin tones (Agbai et al., 2014). While conducting skin surveillance, healthcare providers can use information from the epidemiological and etiological information included in this systematic review to make decisions on what to look for and the proper diagnosis for skin cancer in people with darker skin tones.

The education of patients is another important role that healthcare providers should consider to promote early detection. The study by Harvey et al. (2016) provided a variety of factors that healthcare providers can consider when developing educational interventions. These range from individual factors such as knowledge and perception to societal factors such as healthcare infrastructure and health communication efforts. The study by Perez (2019) provided an example of the areas that healthcare providers can focus educational interventions on such as the promotion of sun-safe behavior, awareness of risks and symptoms, and seeking of health insurance in order to enable timely access to healthcare which can promote early diagnosis. Some educational suggested education techniques suggested in the included studies are the use of photos, self-screening demonstrations, and explanation of the ABCDE rule for melanoma screening (Chung, Brown, and Gibson, 2015). These factors will be considered in the development of a quality improvement plan led by healthcare providers to promote self-efficacy, general knowledge, and self-surveillance for people with darker skin tones.

Besides the detection and diagnosis of skin cancer, the results also elucidate some of the factors that lead to late detection and a poorer prognosis for people with darker skin tones. It can be concluded that low socio-economic statuses, poor sun-safe behavior, language barriers, and lack of access to healthcare facilities contribute to a poorer prognosis. People with darker skin tones are generally noted to perform poorly in their ability to recognize skin cancer characteristics (Korta et al., 2014). Post-test analysis of interventions as seen in the findings shows that education of healthcare providers on the provision of care and education to people with darker skin tones greatly improves awareness, knowledge, and early diagnosis despite the presence of predisposing factors. Implementation of culturally competent interventions. There is still a need for further research on the predisposing factors to skin cancer and delayed diagnosis and how these factors can be mitigated alongside the education of healthcare providers in order to improve outcomes.

It was challenging to recommend the most effective collection of educational interventions for healthcare providers to promote early detection and screening of skin cancer in people of color. This was due to the differences in the type of studies included, their variety of recommendations, and the larger number of skin cancer characteristics that need to be considered for each type of skin cancer. The author agrees with Loh et al. (2016) that there is a need for the development of rational theoretical frameworks for the consolidation of evidence on skin cancer in people with darker skin tones. Due to the complexity of the interventions, future researchers should make use of larger sample sizes and mixed methods in order to make a correct evaluation of the outcomes of specific interventions (Fugard and Potts, 2015). Despite these difficulties, applicable components collected from the studies will be consolidated into a quality improvement plan that will be used to provide healthcare providers with education on interventions they can apply to promote early detection and screening of skin cancer in people with darker skin tones.

Limitations

The systematic review has some limitation that mostly arises from the limitations of the included studies. One of the limitations is that some of the included studies had a small sample size. For instance, the study by Chung, Brown, and Gibson (2015) only had 34 participants. Although some of the studies had relatively larger sample sizes, the low sample size in some of the articles can make it difficult to generalize the findings of this systematic review to the entire population of people with darker skin tones. Additionally, the small sample sizes in the studies could have made it difficult for the researchers to record any statistically significant effects. This was specifically evident in the study by Loh et al. (2016) where the researcher noted that there was a small sample size of Hispanics and Asians which made a comparison with the larger sample size of whites difficult.

Another limitation of the systematic review is that the included studies were of moderate or unknown risk of bias. None of the included articles was comparable to well-performed randomize control trials which would have reduced the risk of bias. The lack of proper randomized control trials in the systematic review can be explained by the insufficiency of literature on the topic under study. Most of the studies identified in the databases searchers were not considered for inclusion due to their focus on whites rather than people with darker skin tones. The risk of bias across the studies was also determined to be moderate to serious due to biases in reporting of outcomes, classification of interventions, and bias in the selection of reported results. The use of non-standardized validated tools to measure data and the use of different research methods made it difficult to conduct proper statistical analysis of the findings.

Some of the studies recruited participants in single centers or in specific clinical settings. The recruitment of people from single geographical locations and specific subgroups may mean there was an inadequate representation of all people with darker skin tones. Consequently, the results might not be generalizable to different countries and regions. Lastly, most of the studies were not able to provide information on the cause and effect of educational interventions over time. However, they provided important information that can be used to develop a quality improvement plan to promote the early screening and diagnosis of skin cancer in people with darker skin tones.

Conclusions

In conclusion, the collected evidence agrees with previous systematic review and studies that acknowledge the presence of disparities in the screening, diagnosis, and outcomes of skin cancer in people with darker skin tones. These populations usually have more late diagnoses, poorer knowledge and information on skin cancer, and in some cases poorer outcomes due to the late diagnoses. The lack of large scale studies on appropriate interventions for these disparities makes it difficult for healthcare providers to determine the best interventions. This systematic review identifies some of the best intervention that if well implemented can guide the education of healthcare providers to promote early screening and diagnosis of skin. The studies included in the systematic review investigate various areas on skin cancer prevention, screening, and even cancer management that can be applied by healthcare providers. Despite the reported limitations, the studies provide valuable information that can be used to make an improvement to the management of skin cancer in people with darker skin tones.

There is a need for the development of elaborate practice guidelines that can help in the implementation of this systematic review's findings in practice. Such a guideline would elucidate the best combination of interventions that can be implemented on healthcare providers such as education on skin cancer detection and training of people with darker skin tones on how to perform skin examinations. In future studies, researchers should put more emphasis on conducting primary research on skin cancer and educational interventions since there was a lack of sufficient primary studies when researching this topic. It is also recommended that future studies should consider investigating the effectiveness of skin cancer interventions in people with dark skin tones. These endeavors would lead to the development of better practice guidelines. Increased research efforts would also improve engagement with the target population who are increasingly disproportionately affected by morbidity and mortality of skin cancers.

QUALITY IMPROVEMENT PROJECT

INTRODUCTION

Background

A systematic review was recently conducted to determine the effectiveness of educational interventions to promote early screening and diagnosis of skin cancer in people with dark skin tones. The review outlined several interventions that if well implemented can guide the education of healthcare providers to promote early screening and diagnosis of skin.It was under the premise of this systematic review that the inceptor developed and implemented a quality improvement project. The project involved the implementation of an educational intervention for healthcare providers to improve early screening and diagnosis of skin cancer in individuals with dark skin tones. This document outlines the details of the project from its inception to completion.

Problem Addressed

Skin cancer is a significant public health concern in the United States. Although individuals with white skin tones are more prone to developing skin cancer, people with darker skin tones are more likely to be diagnosed with melanomas at an advanced stage which increases their morbidity and mortality (Agbai et al., 2014). Limited access to medical care, poor awareness on skin cancer, less frequent screening, lack of knowledge among healthcare providers, and decreased suspicion of melanoma in nonwhite patients are some of the factors that have been noted to contribute to the disparities in morbidity and mortality (Korta, Saggar, Wu, and Sanchez, 2014).

Furthermore, there is a noteworthy difference in the ability of healthcare providers and patients to recognize characteristics of melanoma in whites compared to in people with darker skin tones (Garnett, Townsend, Steele, and Watson, 2016). Education of healthcare providers such as on skin cancer detection and patient education is essential since educated healthcare providers and patients are more likely to perform proper skin examination and identify suspicious lesions earlier (Chung, Brown, and Gibson, 2015).

Project Site and Target Population

The quality improvement program was carried out at a medical centre in Florida. The practice office of the centre covers several medical taxonomies including urgent care, primary care, lab and diagnostics, health programs, and vaccinations. The choice to conduct the quality improvement project at the facility was influenced by the number of racially diverse clients that visit and consult at the facility. The quality improvement project targeted the health care providers at the facility to improve the screening and diagnosis of skin cancer. There was a total of 28 participants in the quality improvement project and they included physicians, nurses, and individuals with other healthcare specialties.

AIMS AND GOALS OF THE DNP PROJECT

The quality improvement project aimed to provide an educational intervention to healthcare providers at the facility to increase their knowledge of skin cancer in people with darker skin tones. The QI project also aimed to ensure healthcare providers have access to and follow a proper standardized skin screening and diagnosis routine when attending clients. Patients would also benefit by receiving education on skin cancer to encourage early screening. It was hypothesized that a combination of these endeavors would promote early screening and diagnosis of skin cancer for people with darker skin tones at the facility. This would, in turn, lead to better outcomes for cancer patients with darker skin tones.

SUMMARY OF EVIDENCE

Evidence obtained from a conducted literature review and systematic review revealed that people with darker skin tones face several disparities that lead to a reduction in early screening and diagnosis of skin cancer. One of the factors that lead to late diagnosis was the lack of knowledge by healthcare providers on skin cancer in darker toned patients (Chung, Brown, and Gibson, 2015). Late screening and diagnosis led to poorer outcomes for this segment of the population. Providing healthcare providers with educational interventions has the potential to improve their knowledge and skills on skin cancer screening and diagnosis of people of color (Higgins et al., 2018).

The systematic review also noted that healthcare providers can be educated to provide their patients with training on self-examination. This has been shown in past studies to promote early diagnosis of skin cancer (Mayer et al., 2014; Osborne and Hames, 2014). The findings from the systematic review were used as the source of evidence in the development of this quality improvement project. The success of this project would lead to an increase in the early screening and diagnosis rates in people with darker skin tones which translates to better outcomes as revealed in the conducted literature review and systematic review.

PROJECT DESCRIPTION

Structure

The management of the quality improvement plan mainly consisted of the investigator; Alexander de Varona as the lead person. Help was received from the staff at the clinical site in the preparation, delivery, and evaluation of the educational intervention. The supervisor also provided valuable and constructive guidance in completion of the quality improvement project.

The program was structured in the form of deliverables. Each of the deliverables has its timeline, lead people, resource requirements, and evidence to show that it has been fulfilled.

Deliverables

The deliverablesthat were met in the completion of this quality improvement were; 1) Collection of required resources including the completion of a literature review and systematic review, 2) Conducting of group meeting between the investigators, facility administration, and supervisor to receive stakeholder feedback and incorporate it into the quality improvement project, 3) Preparation of documentation for the project such as the consent forms and questionnaire for data collection, and lastly 4) Implementation of the intervention and collection of relevant data.

Data Collection Strategy

The quality project made use of a questionnaire to collect information. All healthcare providers were expected to complete a pre-test and post-test questionnaire. The questions were similar for both pre and post-test to determine improvement scores resulting from the intervention. There was a variety of questions in the questionnaire including questions on personal information, characterization questions, and questions on the knowledge and skill of the healthcare providers with regards to screening, diagnosis, management, and patient education with regards to skin cancer. All participants were also required to sign a consent form before enrollment to participate in the study. The pre-posttest questionnaire has been attached in this document as Appendix D.

Description of the Intervention

The intervention included a presentation that lasted 20 minutes and an educational handout that contained information on skin cancer in people with dark skin tones. In the presentation, the problem and purpose of the intervention were described to the healthcare providers. The presentation was supplemented by the educational handout which contained information on screening, diagnosis, and management of skin cancer in people with dark skin tones. Some of the information contained in the presentation and educational handout included skin cancer screening and diagnostic techniques, common skin cancer location in people with dark skin tones, patient educations techniques, a catalogue of skin cancer images to help the healthcare providers identify skin cancer in people with dark skin tones.

RESULTS

Demographics

A total of 28 healthcare providers were included in the study. Of these, 57.1% were female while 42.9% were male. The ages of the participants ranged between 27 and 57 years old. A majority of the participants were from the Hispanic ethnicity at 39.2%. African Americans and Asians were underrepresented in the sample at 10.7% and 7.1% respectively. The healthcare providers held a variety of positions at the facility including oncologists, nurses, and physicians. The ***Table 2*** below summarizes the participants' demographic data.

Characterization

A majority of the participants (60.7%) had partaken in one or more training programs on skin cancer in the past three years with 14.3% having undertaken more than 3 training programs. Despite the high training rates, only 25% of the participants reported training on skin cancer in people with dark skin tones. Most of the participants (85.7%) also denied following a proper standardized skin screening and diagnosis routine when attending clients with dark skin tones.

After the intervention, All the participants in the quality improvement program either strongly agreed or agreed that they knew how to conduct screening tests on people with darker skin tones. This was an increase of 50% from the pre-test. Additionally, 92.9% of the participants that had not been following a proper standardized screening routine reported having adopted one after the screening. With regards to the provision of education to patients, the rate increased from 78.6% to 96.4%.

Screening Knowledge and Skills

Many participants (57.1%) rarely conducted full-body visual screening for skin cancer while 10.7% had never conducted a full-body screening. The most common factors that hinder regular full-body screening according to the participants were; time management issues and haste (46.4%) and lack of standardized screening routine (17.9%). The participants were fairly knowledgeable on skin cancer types in people with darker skin, screening tests and systems, cancer locations, and guidelines regarding skin cancer with an average proficiency score of 30%.

After the intervention, there was a significant increase in the number of healthcare providers that reported regularly conducting full-body screening. The number increased from 57.1% to 82.1%. Before the training, 10.7% had never conducted a full-body screening. After the training, only one participant was yet to conduct a full-body screening. The most common factors that hindered regular full-body screening for other healthcare providers remained time management issues and haste. The participant's knowledge of skin cancer types in people with darker skin, screening tests and systems, cancer locations, and guidelines regarding skin cancer increased to an average score of 71.4%.

Diagnosis and Management

A majority of the participants (57.1%) understood the steps necessary in the diagnosis and management of skin cancerbefore the intervention. However, 28.9% were unable to correctly identify skin cancer manifestation in people with dark skin tones. The total knowledge proficiency in diagnosis and management was at 26% before the intervention. This increased to 78.6%. The percentage of participants that understood the steps necessary in the diagnosis and management of skin cancer also increased from 57.1% to 75% after the intervention. The performance in the post-test analysis with regards to the identification of skin cancer manifestation in people with dark skin tones also increased significantly.

Patient Education

Regarding patient education, a majority (92.9%) understood the importance of patient education and the minimum education that should be provided even before the intervention. They all agreed that a minimum package should include training on risk factors, self-screening, and identification of atypical moles and melanomas. The healthcare providers were also knowledgeable about the ways to determine if patients were conducting skin examination and risk factors for skin cancer. The knowledge proficiency with regards to patient education was 42%.

There was no significant change in the provision of patient education among the participants. This can be attributed to the fact that a majority (92.9%) of the participants already understood the importance of patient education. Nonetheless, the knowledge proficiency of how to educate patients increased from 42% to 75%. The overall group average for all the investigated categories was 32.7% in the post-test. This increased to 75% in the post-test analysis. The significant increase was directly attributed to the educational intervention. The ***Table 3*** below outlines the overall group averages for all the investigated categories.

DISCUSSION

Findings

The outcomes were measured in relations to the main goals of the quality improvement plan which were improvement of the healthcare provider's knowledge on skin cancer screening and diagnosis in people with darker skin tones, ensuring healthcare providers have and follow a standardized skin screening and diagnosis routine, and lastly improving patient education in self-screening. The major finding of the quality improvement project was that an educational intervention increased the healthcare provider's post-test scores. This was in line with previous studies that had investigated the effectiveness of educational intervention (Trip et al., 2016; Gordon, 2014).

There was an increase in proficiency in all the targeted sections of the educational intervention namely screening knowledge and skills, diagnosis and management and patient education. An overall group improvement score of 42.3% was recorded which was a statistically significant improvement and confirmed the hypothesis that an educational intervention can improve healthcare providers' knowledge and skills with regards to skin cancer diagnosis and management in people with dark skin tones.

Implications for Practice

The results show than an educational intervention reliant on data can help to identify issues in care and track changes made to improve care. Collection of data in healthcare can allow for comparison and monitoring for sustainable improvement in the care for patients. The importance of patient focus is also emphasized inthe findings. Engagement of patients in their care and their education to improve literacy on self-screening can promote early detection of skin cancer. In summary, the results of the quality improvement provide proof of its intervention and can act as an impetus for the adoption of similar quality improvement projectsin advanced nursing practice and at other healthcare facilities.

EVALUATION PLAN

The goals and outcomes of the quality improvement plan will be evaluated even with the completion of the quality improvement project. Although not part of this project, the patients' views will also be assessed for their engagement in self-screening, knowledge on skin cancer, and satisfaction with the training and service received from the healthcare providers in the quality improvement project. An evaluation will also be one on the healthcare providers six months after the project to determine the impact of the intervention on the overall knowledge skill, and implementation of early skin cancer screening and diagnosis. Since the quality improvement plan is evidence-based, its evaluation will create feedback loops using the data collected from both the healthcare providers and the patients to measure the outcomes and develop fact-based interventions to better inform practice in future.

SUSTAINING PRACTICE CHANGE

The inceptor hopes to publicize the findings widely via open access channels. All relevant deliverable will be availed to anyone in future that needs them. Furthermore, the impact of the quality improvement project will be reviewed regularly even after the end of the project's timeline as outlined in the previous section. These reviews will help to identify issues with the project and outline potential improvement to avoid challenges if implemented in other clinical settings. New approaches will also be included in the program as more data is made available on the success or failure of the project. The inceptor hopes that the project will be duplicated at other clinical sites. Through government lobbying for funds and funding from other related institutions or bodies, the program can be rolled out in other institutions.

CONCLUSION

In conclusion, the quality improvement project demonstrated that an educational intervention for health care providers is a feasible way to improve early screening and diagnosis of skin cancer in people with dark skin tones. A similar project can be replicated other clinical sites and expect similar outcomes. The project as constituted did not determine the long-term benefits but it expected that continuous monitoring and evaluations in the future can help to determine its long-term benefits.

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Table 2

Demographics

Gender	**Number**	**% of the participants**
Male	12	42.9%
Female	16	57.1%
Age		
18-19	6	21.4%
30-49	14	50%
50+	8	28.6%
Ethnicity		
Hispanic	11	39.2%
African Americans	3	10.7%
Caucasians	12	42.9%
Asian	2	7.1%
Profession		
Physicians	8	28.6%
Nurses	16	57.1%
Specialists (e.g oncologists)	4	14.3%

Table 3

Overall group averages

Screening knowledge and skills	**Pre-Test**	**Post-Test**	**Improvement Score**
Average score	30%	71.4%	41.4%
Diagnosis and Management			
Average score	26%	78.6%	52.6%
Patient Education			
Average score	42%	75%	33%
Overall Average Group	32.7%	**75%**	**42.3%**

APPENDIX

APPENDIX A: DISSEMINATION PLAN

DISSEMINATION PLAN

Background

Skin cancer is a significant public health concern in the United States. Although individuals with white skin tones are more prone to developing skin cancer, people with darker skin tones are more likely to be diagnosed with melanomas at an advanced stage which increases their morbidity and mortality(Agbai et al., 2014; Chung et al., 2015; Garnett et al., 2016; Higgins et al., 2018). It was under this premise that the quality program was developed and implemented. The program provided an educational intervention to healthcare providers to improve early screening and diagnosis of skin cancer in individuals with dark skin tones. This document outlines the dissemination plan of the data and findings from the quality improvement programs.

Findings

Pre-test and post-test questionnaires were used to evaluate the outcomes of the quality improvement project. The outcomes were measured with the goals of the quality improvement plan. The three goals were improvement of the healthcare provider's knowledge on skin cancer screening and diagnosis in people with darker skin tones, ensuring healthcare providers have and follow a standardized skin screening and diagnosis routine, and lastly improving patient education in self-screening. The educational intervention targeted these three areas.

The major finding of the quality improvement project was that an educational intervention increased the healthcare provider's post-test scores. There was an increase in proficiency in all the targeted sections namely screening knowledge and skills, diagnosis and management and patient education. The overall group improvement score was 42.3%. This was a statistically significant improvement and confirmed the hypothesis that an educational intervention can improve healthcare providers' knowledge and skills with regards to skin cancer diagnosis and management in people with dark skin tones.

The results also show than an educational intervention reliant on data can help to identify issues in care and track changes made to improve care. Collection of data can allow for comparison and monitoring for sustainable improvement in the care for patients. The importance of patient focus is also emphasized in the results. Engagement of patients in their care and their education to improve literacy on self-screening can promote early detection of skin cancer. In summary, the results of the quality improvement provide proof of its intervention and can act as an impetus for the adoption of a similar QI at other healthcare facilities.

Dissemination Goals

The central goal of disseminating these findings is to maximize the opportunity for the implementation of a similar quality improvement plan at other healthcare facilities. This will ensure that healthcare providers receive an education that helps them to improve early screening and diagnosis of skin cancer in people with darker skin tones. The dissemination and communication activities will pursue four main objectives namely to; raise awareness and interest around educational interventions for healthcare providers, encourage individuals to actively engage in self-examination, identify expectations among stakeholders and policymakers, and finally to disseminate the findings in a targeted and strategic way.

End Users and Stakeholders

Stakeholder mapping was used to identify individuals and groups that would be affected by proposed actions and findings. The individuals were then grouped based on their interest factors, actions, and the potential impact of the proposed actions and findings on them. The end-users and stakeholders identified were healthcare administrators, healthcare providers, and individuals with darker skin tones. The healthcare providers are targeted because they are responsible for the implementation of similar quality improvement projects at their facilities. The healthcare providers, on the other hand, are the group that undergoes the intervention to improve their knowledge and skills with regards to patient education, screening, and diagnosis of skin cancer. Lastly, it is hoped that the findings will promote self-screening in people with dark skin tones to improve early diagnosis.

Dissemination Partners

Recognizing the importance of building significant partnership and responsiveness around the findings of the quality improvement plan involves the collation of an extensive partner map and a publication strategy aimed at reaching a diverse audience. The inceptor of the QI project will make a concerted effort to publicize the findings of the quality improvement within his network to facilitate the dissemination and use of the findings and proposals in other contexts and projects. The target partners are experts in academia and other researchers, the media, policymakers at different levels, and administrators of healthcare organizations and facilities.

Experts in academia and other researchers will be involved in the discussion on the findings, sustainability, and applicability of the quality improvement project in other contexts. Different forms of media will be used to disseminate and communicate the information to the general public about the importance of self-screening. Policymakers, like the experts and researchers, will be involved in the discussion of the findings and the potential for implementing policies based on the findings to improve screening and diagnosis. Lastly, healthcare organizations and facilities will be engaged in the dissemination of the findings at their respective sites.

Dissemination Plan of Project Findings

Dissemination of the quality improvement project will focus on engaging and innovative ways to share the finding with a diverse audience that includes non-academic and academics. The channels of dissemination will include the publication of the systematic review that led to the development of the quality improvement project in the Journal of Dermatology Nurses, presentation of project findings at an academic conference of the Dermatology Nurses Association, project brochures, project workshops to present and discuss the project outcomes with stakeholders, and completion of a DNP paper on the quality improvement project. Involvement of the stakeholders identified earlier will enable better collaboration in the dissemination plan.

Barriers to Dissemination and Utilization of Research

The one barrier dissemination was that the project was not long enough to determine long-term benefits or outcomes of the interventions. Several stakeholders have already expressed questions on the long-term impact of implementing such a program. It is expected that continuous evaluation of the project and dissemination as outlined in the next section will help to determine long-term benefits. It is also expected that appropriate improvements will be made to the project in future to improve its impact.

Evaluation of Dissemination and Utilization of Research

The impact of the dissemination plan will be assessed both quantitatively and qualitatively. Various success criteria and measurable indicators will be monitored regularly. The measure that will be used to evaluate the success of dissemination and utilization of the finding include; confirmed publication of the systematic review, presentation of findings in at least one academic conference, distribution of a hundred project brochures, and completion of two multi-stakeholder project workshops. Proof for achieving these target measures will include the QI project report, project document such as the questionnaire, and the DNP paper. At the end of the project, a catalogue of all the publications and presentation created as part of the project will be compiled to summarize feedback received from experts and other academics.

Sustainability of the Project's Impact Over Time

The inceptor hopes to publicize the findings widely via open access channels. All relevant deliverable will be availed to anyone in future that needs them. Furthermore, the impact of the quality improvement project will be reviewed regularly even after the end of the project's timeline. These reviews will help to identify issues with the project and outline potential improvement to avoid the challenges if implemented at other organizations. New approaches will also be included in the program as more data is made available on the success or failure of the project. The inceptor hopes that the project will be duplicated at other clinical sites. Through government lobbying for funds and funding from other related institutions or bodies, the program can be rolled out in other institutions.

Summary

The quality improvement project demonstrated that an educational intervention for health care providers is a feasible way to improve early screening and diagnosis of skin cancer in people with dark skin tones. A similar project can be replicated in similar clinical sites with expected similar success. The project did not determine the long-term benefits but it expected that continuous monitoring and evaluations in the future can help to determine its long-term benefits.

APPENDIX B: DATA GATHERING TOOL

PRETEST AND POSTTEST QUESTIONNAIRE

Impact of Educational Interventions for Healthcare Providers on Improving the Screening and Diagnosis of Skin Cancer for Latin Americans and Other Patients with Darker Skin Tones

INTRODUCTION

This quality improvement project aims to determine the impact of educational interventions for healthcare providers on improving the screening and diagnosis of skin cancer for Latin Americans and other patients with darker skin tones.

Please answer the question below to the best of your ability. This will help to ensure that areas of knowledge gaps are covered in the intervention. The questions are structured differently and instructions are provided on how to answer each question. These questions are meant to test knowledge and perceptions on screening, diagnosis and management, and patient education on skin cancer.

Your responses and comments will help to improve future educational interventions and programs; as well as assess how much knowledge you have acquired by participating in this educational intervention.

PERSONAL INFORMATION

1. Gender:

☐ Male ☐ Female

2. Age: ....

3. Ethnicity:

☐ Hispanic
☐ African American
☐ Caucasian
☐ Asian
☐ Other

4. Position at the Facility: ....

CHARACTERIZATION

5. How many training programs on skin cancer have you attended in the past three years?

☐ None
☐ 1
☐ 2
☐ 3
☐ More than 3
☐ I don´t know how many trainings I attended in the last three years

6. If attended at least 1 cancer training program, what proportion of the programs covered skin cancer in people with dark skin tones:

☐ None
☐ 1
☐ 2
☐ 3
☐ More than 3
☐ I don´t know how many trainings I attended in the last three years

7. For the following statements, please choose strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), or Strongly Disagree (SD);

Statement	**SA**	**A**	**U**	**D**	**SD**

I know how to screen for skin cancer in Latin Americans and other clients with dark skin tones					
I have and follow a proper standardized skin screening and diagnosis routine when attending clients					
I routinely provide my clients with education on self-examination for skin cancer					

SCREENING KNOWLEDGE AND SKILLS

8. How often do you conduct full-body visual screening for skin cancer in clients with dark skin tones:

☐ Often ☐ Never ☐ Rarely

9. Which of the following are skin cancer screening tests: (Mark all that apply)

☐ Biopsy ☐ Endoscopy ☐ I don't know

☐ Mammography ☐ Cytology ☐ Dermoscopy

10. Which is the most common form of skin cancer in people with darker skin tone:

☐ Squamous cell carcinoma ☐ Basal cell carcinoma

☐ Melanoma ☐ Merkel cell tumors

11. Which factors make identification of skin cancer in people with darker skin tones difficult: (Mark all that apply)

☐ Differences in tumor location compared to whites

☐ Disparities in the number of healthcare providers with dark skin tones

☐ Common cancer types in people of color are different from those in whites

☐ Differences in the appearance of tumors

☐ Lack of sufficient skin cancer screening tools

12. Which of the following systems can be used to determine whether a mole or growth may be melanoma:

☐ Six P's

☐ SPARED

☐ ABCDE

☐ HA^{2}PPIED

13. Which is the most common location of squamous cell carcinoma in people with darker skin tone:

☐ Head, armpit, behind the knee, and forearms

☐ Head, limbs, and hips

☐ Head, neck, lower limbs, and genitals

☐ Face, ears, chest, and back

☐ Nail beds, soles of feet, and palms of hands

14. Which of these guidelines are you conversant with in regards to skin cancer screening:

☐ National Institute for Health and Care Excellence (NICE) guideline

☐ US Prevent Services Task Force (USPSTF)

☐ Both NICE and USPSTF guidelines

☐ None

15. Which of the following factors hinder you from performing regular full-body screening examinations on people with dark skin tones: (Mark all that apply)

☐ A large number of patients

☐ Fatigue

☐ Haste

☐ Lack of standardized screening routines

☐ Believe it is unnecessary

DIAGNOSIS AND MANAGEMENT KNOWLEDGE

16. Screening and diagnosis of skin cancer may involve all of the following steps except:

☐ Taking full health history

☐ Examining suspicious area

☐ Endoscopic exam

☐ Head to toe skin examination

☐ Feeling of lymph nodes

☐ Biopsy

17. A client reports that they have noticed a brown spot on their inner thigh. Which action should the healthcare provider do first?

☐ Refer the client to biopsy

☐ Assess the lesion for size, color, and symmetry

☐ Report the anomaly to the supervisor

☐ Conduct imaging test to ascertain suspicion

18. Which type of skin cancer manifestation in people with dark skin tones is described by the statements below: (Squamous cell carcinoma (SSC), basal cell carcinoma (BSC), melanoma (M).

Statement	**SSC**	**BSC**	**M**
Porcelain-colored plaque on the neck and head with indurated, depressed or flat, shiny, smooth, and indistinct borders			
Firm superficial, well-demarcated, keratotic black or brown hyperpigmented plaques or papules that emerge from an indurated rounded, and elevated base			
Dark patch or macule and with a history of spreading rapidly and loosely defined hypopigmented patches			

KNOWLEDGE ON PATIENT EDUCATION

19. The minimum package of patient education on skin cancer should include: (Mark all that apply)

☐ Risk factors

☐ Self-screening

☐ Identification of atypical moles and melanomas

☐ ABCDE rule

☐ Biopsy procedures

20. Which are effective ways to determine if clients are routinely conducting skin examination include;

☐ Observing clinical practice

☐ Interviewing clients

☐ Reviewing medical records

☐ all of the above

21. Some of the risk factors for skin cancer in people with darker skin tones include: (Mark all that apply)

☐ Excessive exposure to UV radiation

☐ Fair skin

☐ Precancerous skin lesions

☐ A family history of skin cancer

☐ High altitude climate

22. Which of the following should be recommended to clients with dark skin tones: (Mark all that apply)

☐ Report any unusual moles

☐ Always use sun-protection when outdoors

☐ Discuss with healthcare providers if you are at risk of skin cancer

☐ Report changes in your skin to the healthcare provider

☐ Conduct regular full-body skin examinations

23. Which of the following are non-UV risk factors for skin cancer in people with dark skin tones: (Mark all that apply)

☐ Scarring

☐ Inflammation

☐ Injury/Trauma

☐ Weakened immune system

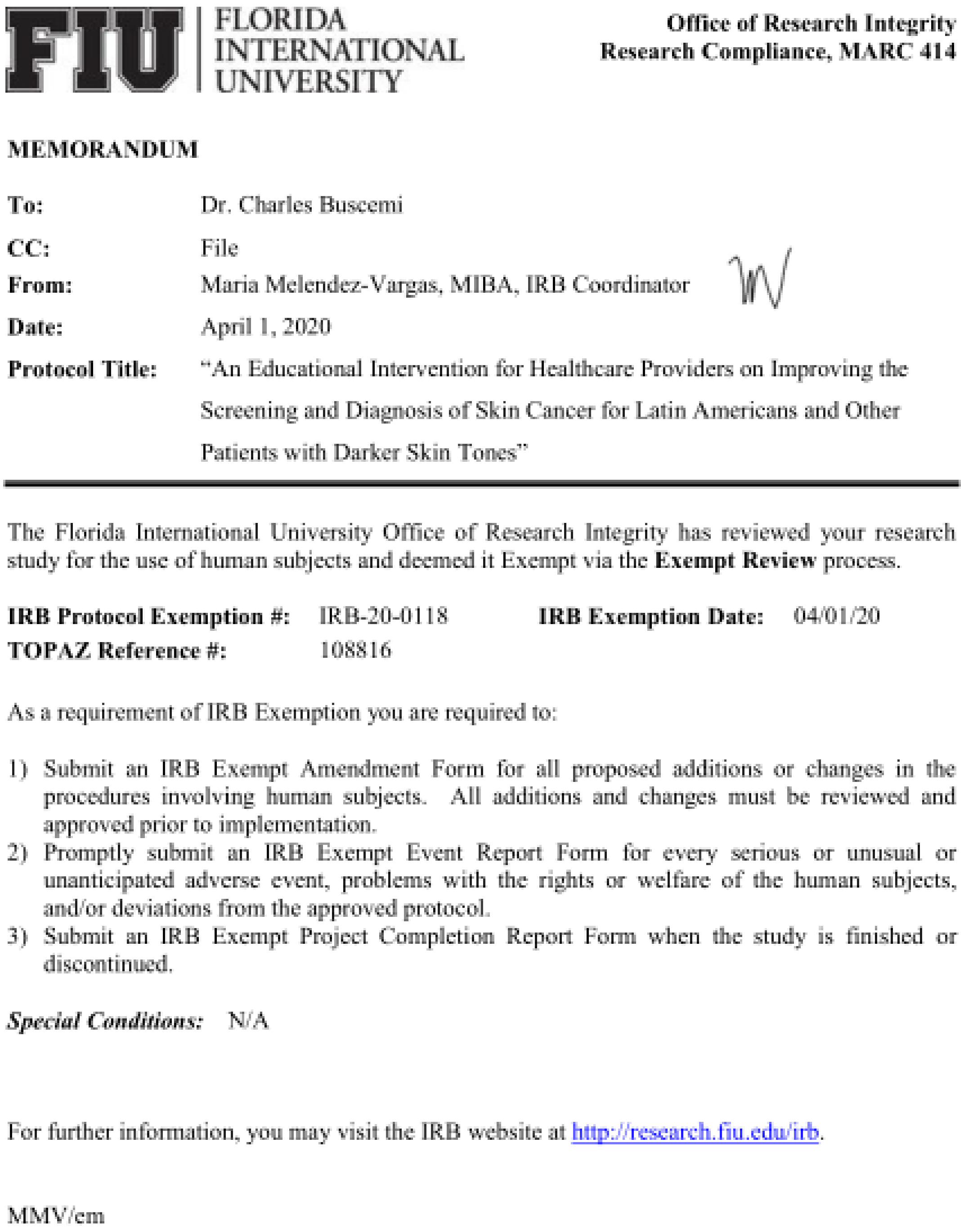
☐ Human papillomavirus (HPV) infection

☐ Tanning

- Albinism

- Pre-existing mole

APPENDIX C: APPROVAL LETTER



FIU | FLORIDA INTERNATIONAL UNIVERSITY

Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To: Dr. Charles Buscemi
CC: File
From: Maria Melendez-Vargas, MIBA, IRB Coordinator
Date: April 1, 2020
Protocol Title: "An Educational Intervention for Healthcare Providers on Improving the Screening and Diagnosis of Skin Cancer for Latin Americans and Other Patients with Darker Skin Tones"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-20-0118 **IRB Exemption Date:** 04/01/20
TOPAZ Reference #: 108816

As a requirement of IRB Exemption you are required to:

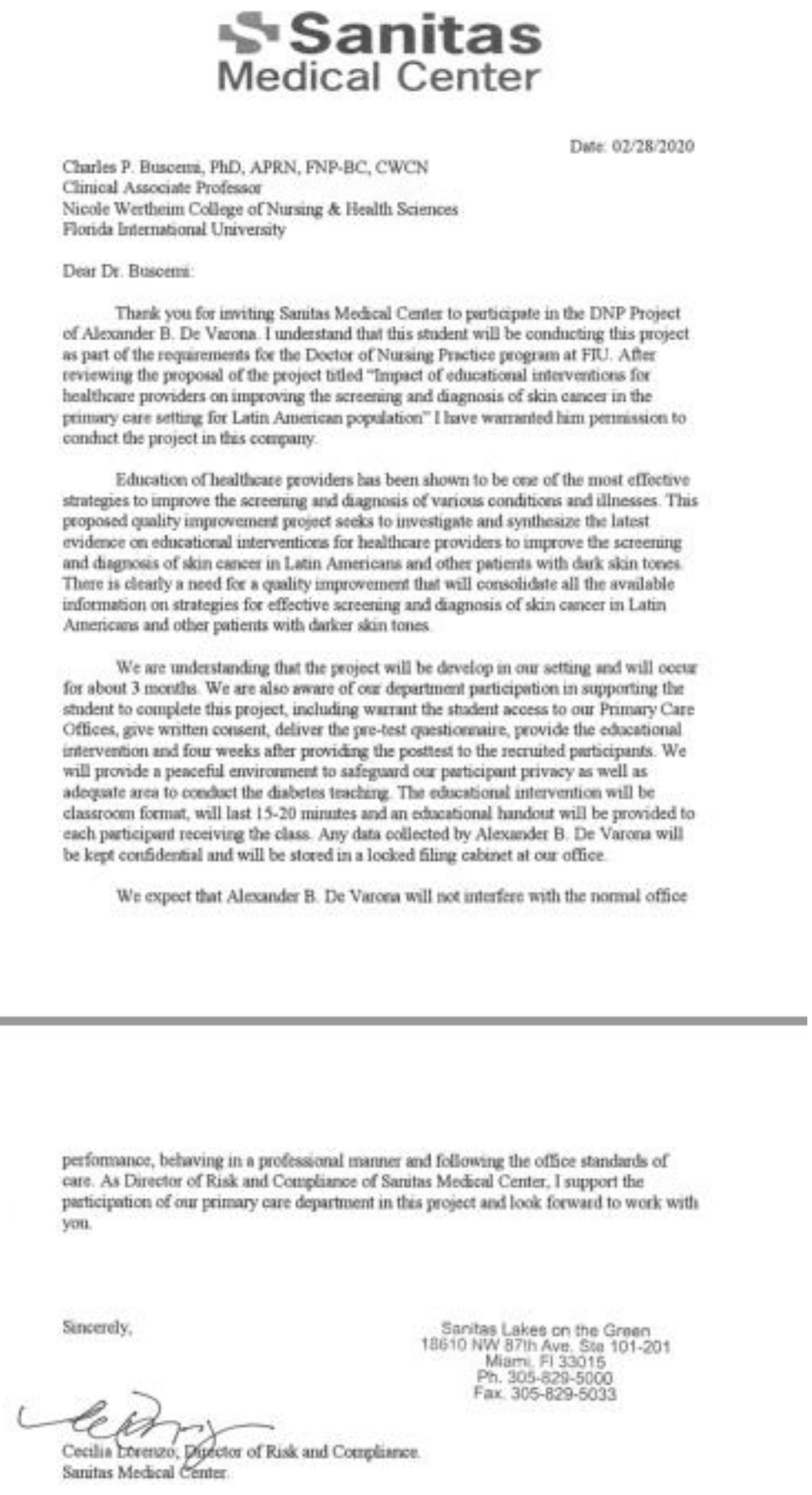
1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

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

MMV/em

APPENDIX D: LETTER OF SUPPORT



Sanitas
Medical Center

Date: 02/28/2020

Charles P. Buscemi, PhD, APRN, FNP-BC, CWCN
Clinical Associate Professor
Nicole Wertheim College of Nursing & Health Sciences
Florida International University

Dear Dr. Buscemi:

Thank you for inviting Sanitas Medical Center to participate in the DNP Project of Alexander B. De Varona. I understand that this student will be conducting this project as part of the requirements for the Doctor of Nursing Practice program at FIU. After reviewing the proposal of the project titled "Impact of educational interventions for healthcare providers on improving the screening and diagnosis of skin cancer in the primary care setting for Latin American population" I have warranted him permission to conduct the project in this company.

Education of healthcare providers has been shown to be one of the most effective strategies to improve the screening and diagnosis of various conditions and illnesses. This proposed quality improvement project seeks to investigate and synthesize the latest evidence on educational interventions for healthcare providers to improve the screening and diagnosis of skin cancer in Latin Americans and other patients with dark skin tones. There is clearly a need for a quality improvement that will consolidate all the available information on strategies for effective screening and diagnosis of skin cancer in Latin Americans and other patients with darker skin tones.

We are understanding that the project will be develop in our setting and will occur for about 3 months. We are also aware of our department participation in supporting the student to complete this project, including warrant the student access to our Primary Care Offices, give written consent, deliver the pre-test questionnaire, provide the educational intervention and four weeks after providing the posttest to the recruited participants. We will provide a peaceful environment to safeguard our participant privacy as well as adequate area to conduct the diabetes teaching. The educational intervention will be classroom format, will last 15-20 minutes and an educational handout will be provided to each participant receiving the class. Any data collected by Alexander B. De Varona will be kept confidential and will be stored in a locked filing cabinet at our office.

We expect that Alexander B. De Varona will not interfere with the normal office performance, behaving in a professional manner and following the office standards of care. As Director of Risk and Compliance of Sanitas Medical Center, I support the participation of our primary care department in this project and look forward to work with you.

Sincerely,

Cecilia Lorenzo, Director of Risk and Compliance.
Sanitas Medical Center.

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