

A DIGITAL INTERVENTION TO EDUCATE PRIMARY CARE PROVIDERS
TO PERFORM CLINICAL SKIN EXAMINATION FOR MELANOMA
IN UNDERSERVED PATIENTS

by

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As members of the DNP Project Committee, we certify that we have read the DNP project prepared by Kyla Jean Diesner, titled A Digital Intervention to Educate Primary Care Providers to Perform Clinical Skin Examination for Melanoma in Underserved Patients and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.

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DEDICATION

I would like to dedicate this project to my loving husband, Donnie, my incredible parents, Jana and Foster, and to my precious dog Duke. Thank you for your unconditional love and patience with me throughout graduate school. I could not have done it without you all.

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ABSTRACT

Background: Skin cancer is the most common cancer in the U.S. and melanoma is the deadliest type. Family nurse practitioners (FNPs) commonly work as primary care providers (PCPs) to care for underserved patients who are at risk of melanoma, but PCPs generally have a low knowledge of melanoma and low likelihood of performing clinical skin examination (CSE) for those patients. The U.S. Preventative Services Task Force recommends that PCPs conduct a thorough skin examination during patient examinations to aid in early detection of suspicious skin lesions. There is little information on how PCPs learn about CSE for melanoma or perform it in practice for their underserved patients.

Purpose/Aims: To provide a digital video intervention to educate PCPs including FNPs, about CSE for melanoma in underserved patients. CSE was defined as melanoma risk assessment, head-to-toe skin examination, and skin lesion assessment. Aims were to determine whether scores improved postintervention for 1) CSE knowledge, motivation, and skills and 2) self-reported CSE in practice.

Methods: This quality improvement (QI) project targeted a healthcare organization in Southern Arizona that served homeless, low income, Medicaid-eligible, Native American, migrant farmworkers, and rural populations. Recruited were 14 PCPs working in the organization's six regional clinics. The Information-Motivation-Behavioral Skills (IMB) model guided the project. Participants completed an online pretest measuring CSE information (melanoma in underserved populations, risk factors), motivation (for conducting CSE), behavior skills (for CSE) and behavior change outcomes for CSE (number performed in practice). The intervention consisted of four brief videos previously tested for feasibility, each less than seven minutes long and

delivered digitally. The videos covered melanoma in underserved populations and the CSE components. Participants completed an identical online posttest two weeks postintervention.

Results: All data were self-reported and analyzed using descriptive statistics. Six PCPs recruited (42.9%) participated: all were FNPs with a mean age of 39.83 years and a mean of 3.33 years of primary care experience. Scores for information, motivation and behavioral skills all improved from pretest to posttest: the proportion of correct scores for information improved from 62.5% to 81.2%. Mean scores for motivation improved from 3.81 to 3.98 (1=strongly disagree, 5=strongly agree). Mean percent of correct responses for head-to-toe skin examination steps improved from 16.7% to 50%. Overall mean percent of correct answers for skin lesion assessment improved from 70.8% to 71.9%. The mean number of CSEs performed in practice increased from 1.33 to 9.50.

Conclusion: The results show potential to provide a video intervention within this and other organizations to improve FNPs' CSE skills and motivate FNPs to use those skills while caring for underserved patients. FNPs may need further instruction on skin lesion assessment. Future research directions include conducting a randomized controlled trial to determine the effect of the intervention on CSE outcomes and to further inform evidence-based practice for FNPs. Future directions considered by the organization are 1) showcasing the videos at upcoming provider meetings and 2) integrating the videos into PCP orientations. Future directions for education include securing continuing education credits for the intervention.

INTRODUCTION

Background Knowledge

Skin cancer in the United States (US) is the most commonly diagnosed cancer and constitutes a public health burden (American Cancer Society [ACS], 2019). In 2015, an estimated 1,222,023 people were living with the most serious skin cancer, melanoma, in the US, of which, approximately 1,879 were Arizonans (Arizona Department of Health Services [ADHS], 2017). In 2019, there will be about 96,480 new cases of melanoma diagnosed in Americans and 7,230 expected deaths from melanoma (ACS, 2019). For all stages of melanoma, annual treatment costs ranged from \$44.9 million among Medicare patients with existing cases to \$932.5 million among newly diagnosed cases across all age groups in 2012 (Guy, Ekwueme, Tangka, & Richardson, 2012).

Persons in underserved populations with darker skin tones may have lower incidence rates of skin cancer than white patients (Imahiyerobo-Ip, Ip, Jamal, Nadiminti, & Sanchez, 2011; Korta, Saggar, Wu, & Sanchez, 2014). For example, melanoma is over 20 times more common in whites than in African Americans (ACS, 2019). Overall lifetime risk of melanoma is about 2.6% (1 in 38) for whites, 0.1% (1 in 1,000) for African Americans, and 0.58% (1 in 172) for Hispanics (ACS, 2019). Currently there is a rising incidence of melanoma among Hispanics, a growing minority population in the United States who typically present with advanced stages of disease and experience higher melanoma mortality rates than non-Hispanics (Harvey, Oldfield, Chen, & Eschbach, 2016). There is concern that Arizona health care providers are under-reporting melanoma incidence owing to lack of knowledge about performing a thorough skin examination and identifying suspicious skin lesions (ADHS, 2017).

A thorough skin examination is important to perform during patient examinations to aid in early detection of suspicious lesions (U.S. Preventive Services Task Force, 2016). Clinical skin examination (CSE) can be conceptualized as a process of melanoma risk assessment, whole-body head-to-toe examination, and assessment of skin lesions as suspicious or not suspicious (Stratton, 2019). A recent systematic review of skin cancer early detection by advanced practice nurses (APNs) found that training these practitioners helped them to conduct CSE as well as recognize and refer skin lesions that were suspicious or not suspicious for further work-up (Loescher, Stratton, Slebodnik, & Goodman, 2018). These authors also reported that there were few training opportunities available for APNs and other PCPs to learn these skills (Loescher et al., 2018). Additionally, there is a dearth of literature about conducting CSE in underserved patient populations.

APNs such as family nurse practitioners (FNPs) commonly work with underserved patient populations that have a high risk of skin cancer and a low likelihood of having a thorough CSE performed by primary care providers (Chau et al., 2002; Wilde, Jones, Lewis, & Hull, 2013). Underserved populations include Americans who have an income below the poverty line or live in a geographically isolated location, which limits their access to primary health care services (Health Resources & Services Administration [HRSA], 2016). Specifically, the homeless, low income, Medicaid-eligible, Native American, and migrant farmworker populations are considered underserved and face linguistic, economic, and/or cultural barriers to health care (HRSA, 2016). Miller et al. (2015) in a study of prevalence and predictors of recent CSE, found that lower socioeconomic status and racial/ethnic minority status were associated with a lower likelihood of patients receiving a recent CSE. Patients in underserved populations

with darker skin tones are more likely to have advanced skin cancer diagnoses and lower survival rates due to infrequent CSE (Imahiyerobo-Ip et al., 2011; Korta et al., 2014). Thus, providers caring for underserved patients are a prime target for CSE instruction.

Local Problem

Arizona suffers from a disproportionate distribution of providers evident by a total of 439 federally designated Health Professional Shortage Areas (HPSAs), consisting of 160 primary care, as well as 37 medically underserved area (MUA) and nine medically underserved population (MUP) designations (ADHS, 2016). There is limited information on how many FNPs work in underserved areas in Arizona. Out of the 3,068 licensed NPs practicing in Arizona, 287 work as primary care NPs in rural, medically underserved areas (Tabor et al., 2014). Out of the 2,005 Arizona licensed physician assistants (PA) in 2013, only 254 worked in a MUA (Tabor et al., 2014). In a 2012 report by the Arizona Health Education Centers Program, only about 9 percent of all physicians in Arizona reside in a MUA, and it is unknown how many of those practice in a primary care setting (Arizona Sonoran News Service, 2015).

In Arizona, there is little information on how PCPs learn about performing CSE for melanoma and assess suspicious lesions for referral to dermatologists (ADHS, 2017). In a primary care practice with few resources and little time, it can be hard to prioritize incorporating a CSE into an office visit. This Doctor of Nursing Practice (DNP) project focused on delivering a brief educational intervention on CSE for melanoma to a sample of Arizona PCPs working with underserved patient populations. For the purpose of this project, a CSE was defined as a process that includes melanoma risk assessment; a whole-body, head-to-toe skin examination; and skin

lesion assessment. PCPs sought for recruitment included FNPs, physician assistants (PA), and physicians specializing in primary care.

Purpose

The purpose of this DNP project was to provide a digital intervention that educates PCPs about CSE for melanoma for providers caring for underserved patients. This quality improvement (QI) project examined whether this intervention improved participants' knowledge for CSE as it pertains to underserved patient populations, enhanced motivation and skills for performing CSE, and led to self-reported CSE. The stakeholders were the FNPs and other PCPs working in Arizona underserved clinics and the underserved patients affected by the education intervention at the clinics.

Study Question

Does a digitally delivered brief educational intervention change PCPs' motivation, knowledge, and skills to perform CSE for melanoma in underserved patients over a 2-week period?

Theoretical Framework

Conceptualizing the Problem

The information-motivation-behavior skill (IMB) model provided the conceptual framework for this DNP project. The IMB model assumptions are that key concepts of information, motivation, and behavioral skills are required for any given behavior change (Zhou, Zhang, Knoll, & Schwarzer, 2015). This model was originally developed by Fisher and Fisher (1992) to study HIV but has since been adapted for studying numerous health behaviors such as breast self-examination and post coronary artery bypass graft (CABG) adherence to medication

regiment and participation in cardiac rehabilitation (Misovich, Martinez, Fisher, Bryan, & Catapano, 2003; Zarani, Besharat, Sadeeghian, & Sarami, 2010). The IMB model has been used to frame studies of sunscreen-use behaviors related to skin cancer; however, it has not been used as a foundation for studies of CSE for skin cancer (Zhou, Zhang, Knoll, & Schwarzer, 2015). The IMB model provides a framework for conceptualizing the need for CSE information, motivation and behavioral skills to produce the specific behavior change of performing a CSE (Fisher, Fisher, & Harman, 2003).

The concept of information was defined as basic knowledge about a medical condition including how the disease developed and effective strategies for its management (Fisher, Fisher, & Shuper, 2009). In this DNP project, the information concept was operationalized by the digitally-delivered education videos covering the components of the importance of CSE for melanoma in underserved patient populations, risk factor assessment for melanoma, performance of a head-to-toe skin examination, and how to assess suspicious skin lesions (Chang, Choi, Kim, & Song, 2014; Fisher et al., 2003). However, the by-product of the information, knowledge of these important behaviors, was measured. The concept of motivation was defined as the personal attitudes towards the behavior change and the perceived social support for the behavioral change (Fisher et al., 2009). In this DNP project, the motivation concept included an PCP's personal attitude about incorporating a CSE into a patient's office visit, performance of a CSE, assessment of suspicious skin lesions for at-risk patients and referral of patients with suspicious lesions to dermatologists (Chang et al., 2014; Fisher et al., 2003). Motivation also pertained to encouragement from the PCP work environment to perform CSEs, allowing PCPs extra time to perform CSEs, and reimbursement for performing CSEs in an underserved patient population

(Chang et al., 2014; Fischer et al., 2003). The concept of behavioral skill was defined as a person having the specific behavioral tools or strategies necessary to perform a target behavior (Fisher et al., 2003). In this DNP project, behavioral skill was self-reported CSE performance and skin lesion assessment (Chang et al., 2014; Fischer et al., 2003). Ultimately, the concept of behavior change was operationalized by the self-reported change in CSE for melanoma conducted in patients over a two-week period post intervention (Fischer et al., 2003). The IMB model provided a framework for helping to determine the information and motivation needed by PCPs to change CSE behavior in a clinical setting, particularly in underserved populations (Miller et al., 2015).

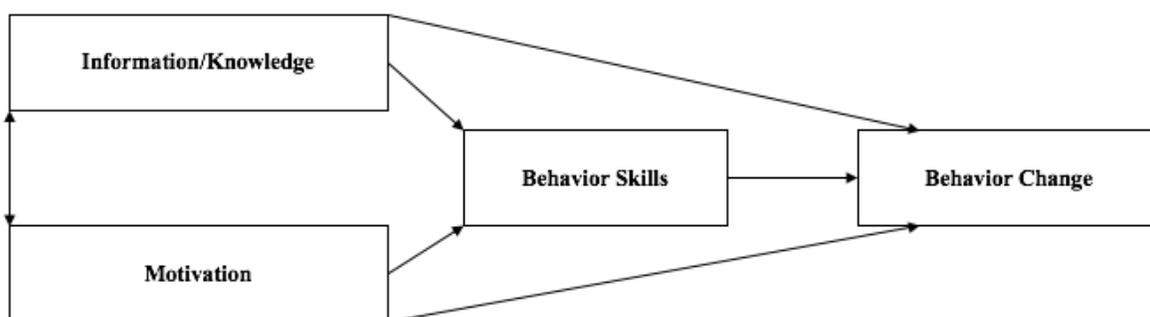


FIGURE 1. The information-motivation-behavior skill model.

Literature Appraisal

Search Strategy

To assess published studies on CSE and CSE education opportunities for PCPs, a literature search was conducted in PubMed, CINAHL, and Google Scholar. The keywords for the search were: primary care providers, clinical skin examination, nurse practitioners, skin cancer detection, melanoma, skin cancer, skin cancer training, underserved, and minority

patients. The search was limited by full text availability, English language, human species, and research articles published within the last ten years. The search yielded twenty-four articles total. Two articles were excluded because they were systematic reviews, and fourteen were excluded due to irrelevance to the study question. The final inclusion criteria for the ten articles selected and appraised for this project were: nurse practitioners or primary care providers, education interventions or interventions that related to early skin cancer detection, suspicious lesion assessment, and CSE. The exclusion criteria for the remaining fourteen articles were: skin cancer diagnosis only, population-based studies, literature reviews, skin cancer screening, and skin cancer primary prevention studies. The results of the search are in Appendix A, Table 1.

Synthesis of Evidence

The overall theme generated from the review was that educational interventions can enhance CSE skills for nurse practitioners (NPs) and other PCPs. Five out of ten studies (50%) had positive outcomes after PCPs participated in an education intervention focused on early detection of skin cancer (Ali, Samarasinghe, Russel, & Lear, 2014; Bradley, 2012; DeKoninck & Christenbery, 2015; Grange et al., 2014; Hartnett & O’Keefe, 2016; Markova et al., 2013).

Another key finding was that proper training of NPs about early skin cancer detection skills reduced the number of referrals to dermatologists and prevented unnecessary skin biopsies (Ali et al., 2012; DeKoninck & Christenbery, 2015; Hartnett & O’Keefe, 2016). For example, in a case study conducted by Ali et al. (2014) a transplant NP completed a six-month master’s level module in skin cancer nursing; post training, dermatology referrals in her practice were reduced by 22% and patients requiring a skin biopsy were reduced by 15.5%. Additionally, a case study by DeKoninck and Christenbery (2015) showed that FNPs who received CSE training enhanced

their ability to detect suspicious skin lesions in 46% of their patients. A pilot study by Grange et al. (2014) found that over 98% of general practitioners (GPs) perceived the skin cancer detection training they received improved their ability to recognize at-risk patients for melanoma and improved their ability to distinguish melanoma from benign lesions.

Another key finding was lack of confidence and motivation for performing CSE. Only 10% to 22% of NPs felt confident in their CSE skills showcasing the need for further education and training for NPs on CSE for skin cancer (Blake & Malone, 2014; Woodmansee, Turnage, & Loerzel, 2018). Less than half of NPs (49%) reported screening patients for skin cancer, and only 20% to 30% of NPs reported conducting a CSE for skin cancer during annual office visits (Blake & Malone, 2014; Roebuck, Moran, MacDonald, Shumer, & McCune, 2015; Woodmansee et al., 2018). The lack of motivation to perform CSE demonstrates the need for NPs to obtain proper training and education to increase NPs' knowledge of skin cancer, motivation to perform CSE, enhance CSE skills and promote behavior changes.

Finally, CSE training is an issue. About, 70% to 90% of NPs believed they did not receive proper training on CSE and early skin cancer detection, with about 85% of participants reporting that they would like additional learning opportunities related to melanoma detection (Blake & Malone, 2014; Grange et al., 2014; Roebuck et al., 2015; Woodmansee et al., 2018). These studies demonstrated that there is not only a need, but also a desire for more education interventions for CSE and skin cancer early detection in the NP community. Contrary to the aforementioned studies, the randomized control trial (RCT) conducted by Markova et al. (2013) found that the effect of an online intervention on early melanoma detection in primary care practice did not improve providers' CSE behaviors because

long-term follow up showed minimal changes in CSE behavior. All other studies incorporating online interventions were successful in improving CSE behaviors (Ali et al., 2014; Blake & Malone, 2014; Bradley, 2012; DeKoninck & Christenbery, 2015; Grange et al., 2014; Goodman et al., 2018; Harnett & O’Keefe, 2016; Roebuck et al., 2015; Woodmansee et al., 2018). In fact, the pilot study conducted by Goodman et al. (2018) found that a brief digital video intervention is highly effective for educating NPs and significantly improved NPs’ knowledge of skin cancer.

Strengths

Ten studies (100%) had focused samples of NPs and other PCPs, which align with the target population for this DNP project (Ali et al., 2014; Blake & Malone, 2014; Bradley, 2012; DeKoninck & Christenbery, 2014; Goodman, Pacheco, & Loescher, 2018; Grange et al., 2014; Hartnett & O’Keefe, 2016; Markova et al., 2013; Roebuck et al., 2015; Woodmansee et al., 2018). This is a strength because these past studies using NP participants support the need for the current DNP project on CSE education interventions for FNPs and other PCPs. Two studies had primary care physicians (not NPs) as the participants who received education interventions; these studies yielded the highest quality of evidence (Grange et al., 2014; Markova et al., 2013). For example, the RCT by Markova et al. (2013) was considered the highest level of evidence because it determined if the intervention was truly effective compared to a control (Zaccagnini & White, 2017). Additionally, the pilot study conducted by Grange et al. (2014) had the highest number of health care provider participants (n=364), and with a high sample size comes greater statistical power and decreased chance of a type two error in the results (Zaccagnini & White, 2017). The one study that most resonated with the DNP project study question was conducted by DeKoninck and Christenbery (2015) who implemented an annual skin cancer detection program

at a medically underserved clinic run by an FNP. Most importantly, six studies (50%) described training activities that successfully improved skills for skin cancer detection (Ali et al., 2014; Bradley, 2012; DeKoninck & Christenbery, 2015; Grange et al., 2014; Hartnett & O’Keefe, 2016; Markova et al., 2013). The majority of evidence supported the usefulness of a digital education program to properly train FNPs and other PCPs about CSE to improve outcomes in underserved patient populations (Ali et al., 2014; Bradley, 2012; DeKoninck & Christenbery, 2015; Grange et al., 2018; Goodman et al., 2018; Hartnett & O’Keefe; Roebuck et al., 2015).

Weaknesses

The quality and strength of 80% of the evidence was weak due to the lack of filtered information and lack of randomization, all contributing to decreased internal validity (Polit & Beck, 2017). Sixty percent of the articles did not identify a theoretical or conceptual framework, which weakens the evidence because a theoretical framework aids in explaining how the study findings relate to the main variables of interest and relationships among them (Zaccagnini & White, 2017). The majority of the studies were unique and not built upon the foundation of previous research. For example, most of the articles were single studies with few subjects and lacked consistency of settings or designs, thereby decreasing the overall generalizability of results for clinical practice and future intervention studies (Zaccagnini & White, 2017). No information on the validity and reliability of the instruments was provided by the authors, further decreasing validity of findings and the ability to replicate the studies (Polit & Beck, 2017).

Gaps

There was a lack of information about skin cancer lesion assessment outcomes throughout the studies examined. The search for evidence revealed a gap in studies about

education interventions to enhance knowledge and skills related to CSE in minority or underserved patient populations. There were no studies pertaining to educational opportunities for NPs to learn about learn about CSE for melanoma in minority patients.

Limitations

This synthesis of the evidence found limited numbers of studies reporting CSE interventions for NPs and other PCPs. There was limited generalizability of findings to primary care practice due to the small sample size and single studies conducted (Zaccagnini & White, 2017). See Appendix A for a complete appraisal of the literature mentioned.

METHODS

Project Plan

Design

This DNP project is a quality improvement (QI) project utilizing a single-subject pretest-posttest design (Institute for Healthcare Improvement [IHI], 2017). QI was acceptable because the DNP project was conducted to improve a problem that has already been discovered specifically related to patient care and seeks to help health care providers in an underserved organization improve patient-centered care outcomes (IHI, 2017). The design was an acceptable design for this QI project because it helped to identify changes in behavior (Finkelman, 2018). This design allowed evaluation of information, motivation, and skills for CSE for melanoma; thereby, filling the gap of this performance by PCPs noted in the literature review and prompting the creation and delivery of this project's education intervention. A strength of a single-subject pretest-posttest design is that all participants receive the same survey questions and intervention, which decreases variability and facilitates replication by future researchers (Knapp, 2016).

Weaknesses of this design include bias affecting the validity and reliability of the results as well as the limited scope and generalization of the results outside of the particular participant group under study (Knapp, 2016). The design enabled collection of data to determine changes in knowledge, motivation and skills for CSE for minority and underserved patient populations post-intervention.

Setting and Participants

The setting consisted of clinics within the United Community Health Center (UCHC), a federally qualified health care organization that provides primary health care to underserved patients in Southern Arizona regardless of their ability to pay (UCHC, 2019). Underserved clinics are defined as clinics that serve the homeless, low income, Medicaid-eligible, Native American, migrant farmworkers, and rural populations (HRSA, 2016). A convenience sample of 14 primary care providers working with underserved patient populations in these clinics were recruited for this project (Zaccagnini & White, 2017). The UCHC has seven primary care clinics located in the rural communities of Green Valley, Sahuarita, Vail, Arivaca, Amado, and Three Points in Southern Arizona (UCHC, 2019). Inclusion criteria were any age, gender, race or ethnicity and number of years of experience. The exclusion criteria were FNPs or other PCPs that did not work with underserved patient populations and did not work in a primary care setting.

Recruitment methods included networking with a preceptor and another FNP working at the principal investigator's (PI) clinical rotation site at UCHC. Snowball sampling, another recruitment strategy, was accomplished by the preceptor informing her colleagues about the project and encouraging them to participate (Finkelman, 2018). The PI drove to all seven UCHC

primary care office locations to speak to the providers in person, and left flyers in the clinic with the DNP project information and PI contact information. See Appendix B to view the recruitment flyer. Seven of the 14 eligible recruits agreed to participate. A target enrollment goal of 7 participants working with underserved patients was an acceptable sample size for this QI project (Finkelman, 2018). A \$25-dollar Amazon gift card was offered as an incentive for participation and was sent via email after completion of all required DNP project activities. The Amazon gift cards were funded in fall 2019 by a Mary Opal Wolanin Doctoral Award received by the PI.

Intervention

The intervention consisted of four brief videos, delivered digitally, that provided participants with information about melanoma in underserved patient populations and CSE for melanoma. The videos were brief owing to evidence supporting the approach of delivering brief bursts of information, which was ideal for busy providers with little time and demanding clinical schedules (Simons, Foerster, Bruck, Motiwalla, & Jonker, 2015). One video was developed by the PI; the other three were CSE videos that were developed and recently tested for feasibility by a University of Arizona College of Nursing PhD/DNP graduate for her doctoral dissertation (Stratton, 2019).

Introductory Segment: Melanoma in Underserved Patients

In the summer of 2019, the PI for this DNP project developed an introductory video about melanoma in underserved patient populations. This development followed rigorous procedures:

1. Precise objectives were created for the video based on evidence pertaining to melanoma in these populations (Clairwood, Ricketts, Grant-Kels, & Gonsalves, 2014; Garnett, Townsend, Steele, & Watson, 2016; Perez, 2019).
2. A storyboard was developed to guide the video content and images. Storyboards are summaries linking all key elements in a fluid and cohesive platform that enhances learning in a visually pleasant manner (McMullen et al., 2018). The storyboards were reviewed for content appropriateness by two PhD nurse researchers specializing in skin cancer early detection.
3. The production of the introductory video involved working with the University of Arizona College of Nursing Office of Learning and Healthcare Innovation Technology Innovations (LHTI) staff. The PI collaborated with the LHTI staff to transform the storyboard into a brief six-minute video. The introductory segment process took two months to develop and finish.
4. The video was uploaded to Vimeo where a link was generated and accessed in the same format as the CSE videos. Vimeo is a video sharing platform that allows video creators a way to share and disseminate their work (Vimeo, 2019).
5. When the introductory video was completed, it was reviewed for content and technology feasibility by two professionals: two PhD nurse researchers specializing in skin cancer early detection.

See Appendix C for the introductory segment video's script and Appendix D for this video's storyboard.

Modules 1-3

The remaining three videos viewed by participants covered melanoma risk assessment, performance of a thorough head-to-toe skin examination, and assessment of suspicious pigmented skin lesions (Stratton, 2019). These were brief videos (7 minutes or less) based on current knowledge of CSE (Stratton, 2019). An expert panel of three dermatologists previously had reviewed the three modules for content validity, information validity, and accessibility, scoring them with a high content validity index score (Stratton, 2019). These videos were tested for feasibility of delivery to a sample of NPs in Arizona (Stratton, 2019). The PI found that the approach to delivering the videos was highly feasible (Stratton, 2019). Both the videos and the approach were replicated in this DNP project.

For the current DNP project, the four brief online videos constituted an intervention to educate PCPs to implement CSE for melanoma in underserved patient populations. All the videos were theory based (on the IMB model) and suitable for digital delivery to PCP participants in various formats such as computer and mobile phone to enhance access in a convenient manner (Simmons et al., 2015). The project ultimately consisted of a pretest based on the IMB model, four brief digitally delivered videos, and a posttest taken two weeks after intervention completion.

Methods for Evaluation

Data Collection Tools

Data was collected electronically via an online survey published in Research Electronic Data Capture (REDCap) software. The availability of user-friendly sophisticated software to develop and deploy surveys helped make this QI design very convenient (Moser & Korstjens,

2018). Since PCPs have demanding schedules the data instruments were able to be programmed to allow the participants to leave the surveys and come back and finish when time in their schedules allowed (Harris et al., 2019). A knowledge recap question was included in the middle of the brief video to enhance learning retention for participants (Moser & Korstjens, 2018). Additionally, there was no interviewer involved; thus, respondents were possibly more willing to provide uninhibited answers to questions (Moser & Korstjens, 2018). The PI attended the three REDCap classes offered by the University of Arizona Health Sciences Center for Biomedical Informatics & Biostatistics. All REDCAP classes were attended in person by the PI including the REDCap Beginners Workshop on May 14, 2019, the REDCap Intermediate Workshop on May 15, 2019, and the REDCap Advanced Workshop on June 20, 2019. See Appendix E to view the REDCap workshops' certificates of completion.

Once the PI received the participant's email addresses, she emailed them a link to the pretest survey. The first item on the pretest was a request for the participant's last 4 digits of their cell phone number, which became the participant's unique ID. The pretest also collected participants' demographic data (age, gender, experience, provider license, percentage of underserved patients seen in clinic, predominant ethnicity and race of patient population seen in their clinic). The demographic data informed the generalizability and external validity of the results (Finkelman, 2018). The pretest and posttest consisted of an adaption of a survey used by Walsh and Petroll (2017) based on the IMB Model, a ranking of CSE steps developed by Stratton (2019) and a 16-item skin lesion assessment tool developed by the PI's project chair (Personal communication, Dr. Lois Loescher, May 2019).

Walsh and Petroll's (2017) IMB Model survey tool was originally used to evaluate PCPs' human immunodeficiency virus (HIV) pre-exposure prophylaxis prescribing behaviors in high risk populations. The PI adapted this IMB Model survey tool comprised of 23-items to correlate to questions that directly related to the DNP project's question. *Information* was assessed through the use of eight multiple choice questions that focused on factual information regarding melanoma risk assessment, head-to-toe skin examination and suspicious pigmented skin lesions (8 items) (Walsh & Petroll, 2017). The answers were scored as correct (1) or incorrect (0), and the percentage of correct responses was determined (Walsh & Petroll, 2017). *Motivation* was measured by having participants rate their level of agreement with six items assessing attitudes towards CSE for melanoma on a 5-point Likert scale (1= completely disagree, 5= completely agree). The motivation items 2, 3, 4, and 5 were reverse coded before analysis. *Behavior skills* was assessed by asking the participants to rank-order the steps of a CSE (8 items). Proper rank order was head and neck (1); scalp, ears, postauricular folds, back of neck (2); arms, hands, chest, abdomen (3); underarms, palms, fingernails (4); back, buttocks (5); groin (6); legs and feet (7); heels, between toes, toenails (8) (Stratton, 2019). Behavior skills for proper CSE order was calculated using the mean percentage of correctly ordering all items (incorrect=0, correct=1). *Behavior skills* was also assessed by asking the participants to identify suspicious versus nonsuspicious skin lesions by taking a 16-item image assessment, for which answers were scored as correct (1) or incorrect (0) (Personal communication, Dr. Lois Loescher, May 2019). The mean percentage of correct scores were calculated (Personal communication, Dr. Lois Loescher, May 2019). CSE *behavior change* was assessed by asking participants to self-report the number

of times they conducted CSE two weeks after viewing the modules. See Appendix F to view the data collection instruments.

Process for Data Collection

After recruitment was finished, the PI determined participants eligibility and obtained consent for participation in the DNP project via a consent disclosure located on the landing page of the survey. Once participants clicked on “I agree” for consent, they were directed to the demographic portion of the pretest. See Appendix G to view the UA IRB approved consent. After completing the demographic portion of the pretest, participants were linked to the pretest questions. After finishing the pretest, the participants were connected to an external link to access the four online video modules. Vimeo REDCap integration of the videos allowed auto generation of the links to each video (Harris et al., 2019).

Participants had a week to watch the four online videos, which only six out of the seven participants completed. The PI tried to contact the one participant who did not watch the four videos by phone and email but was unsuccessful and that participant was dismissed from the rest of the project. The PI emailed a posttest link to the remaining six participants two weeks after they finished viewing all four videos. The PI was able to visualize all participant progress on the pretest, education intervention and posttest in REDCap (Harris et al., 2019). Once the participants completed the posttest, they received the promised incentive. The posttest was completed two weeks after completion of the intervention in order to allow time to measure a more sustained behavior change instead of an immediate change (Finkelman, 2018). See Figure 2 below, which depicts the flow of participation that occurred throughout the project.

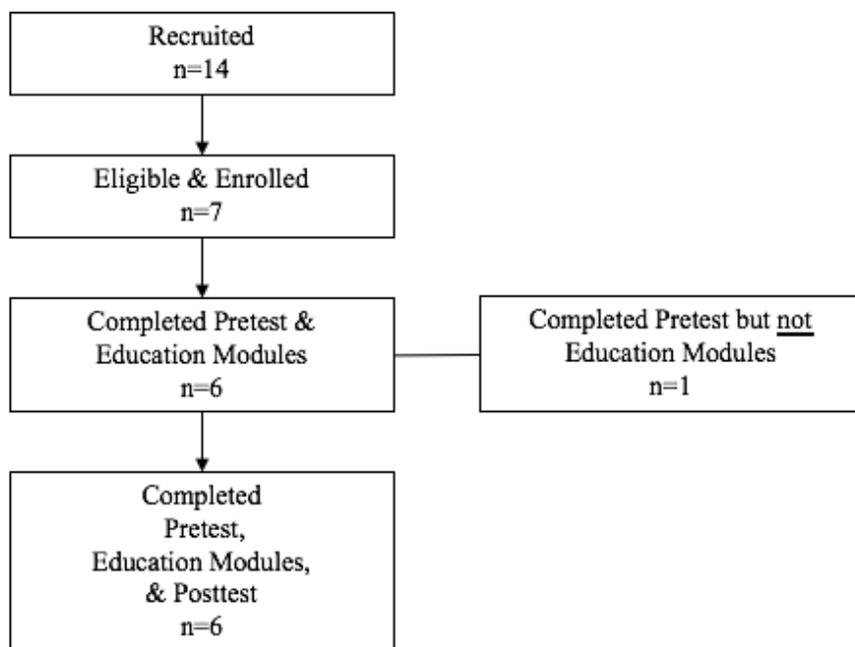


FIGURE 2. Flow of participants through the project.

Ethical Considerations

Respect for Persons

Respect for persons means individuals must have ultimate autonomy and privacy ensured throughout a project or research study (Polit & Beck, 2017). Participation in this DNP project was voluntary, and participants were able to withdraw from the project at any time (American Nurses Association [ANA], 2019). Precautions were made to ensure participants' responses were confidential by using the Institutional Review Board (IRB)-compliant software system REDCap to collect the pretest and posttest data anonymously (Harris et al., 2019). Once collected by REDCap, this software coded the data to make the information confidential so only the PI and statistical consultants had access to the data for analysis (Harris et al., 2019).

Beneficence

Beneficence revolves around the idea to do good for others (Polit & Beck, 2017). There was no foreseeable risk compromising participation in this DNP project. This project aimed to educate PCPs about CSE for melanoma. The intervention benefited PCPs by enhancing their knowledge and motivation to conduct CSE when appropriate. The DNP project indirectly benefited Southern Arizona's medically underserved patient populations by increasing PCP knowledge about detecting melanoma early, which improves patient outcomes (Clairwood, Ricketts, Grant-Kels, & Gonsalves, 2014; Garnett, Townsend, Steele, & Watson, 2016; Perez, 2019).

Justice

Justice refers to the idea that all project participants are treated equally and fairly (Polit & Beck, 2017). Recruitment for this DNP project occurred by fairly targeting PCPs working with underserved patient populations. All participants were treated equally because they received the same pretest, four education video interventions, and posttest to ensure the project's justice (Polit & Beck, 2017).

Institutional Review Board (IRB)

Approval for this DNP project was obtained from the University of Arizona (UA) College of Nursing's Departmental Review Committee, the UA's Human Subject Protection Program (HSPP), and site authorization from the medically underserved health care organization, UCHC that constituted the setting for this DNP project. The project was initiated after all appropriate IRB, HSPP, and site authorization approval was secured. See Appendix H for UCHC site authorization and Appendix I for this project's UA IRB HSPP approval forms.

RESULTS

Data Analysis

Data from REDCap was analyzed with the help of the project chair and her research assistant. REDCap data were exported into excel for further data analysis by the PI. All data including the pretest demographic data were analyzed using descriptive statistics. Frequencies and percentages of correct answers were utilized to analyze pretest and posttest data collected about information/knowledge and behavior skills. Motivation and behavior pretest and posttest data were analyzed by calculating total mean scores and standard deviations. Sample size precluded further data analysis using t-tests to compare the means of interval level data or chi square to determine relationships from pretest to posttest for categorical variables (Heavey, 2019). There were not enough participants to create sufficient statistical power, which would have increased the risk of a type two error occurring (Heavey, 2019).

Outcomes

Participants approximated 40 years of age and were relatively new to primary care practice. The all-female sample was comprised exclusively of FNPs who all had underserved patients. The demographic information about participants is listed in Table 1.

TABLE 1. *Characteristics of participants (n = 6).*

Characteristic		Mean (SD)	
Age		39.83 (4.96) 35-49	
Years of Experience		3.33 (1.97) 1-6	
		Frequency	Percent
Gender	Female	6	100
	Male	0	0
Provider License	FNP	6	100
	MD	0	0
	DO	0	0
Proportion Underserved Patient Population	0-25%	0	0
	26-50%	2	33.3
	51-75%	2	33.3
	76-100%	2	33.3
Dominant Ethnicity of Patient Population	Hispanic or Latino	3	50
	Not Hispanic or Latino	3	50
	White	6	100

Abbreviations: SD= Standard Deviation, FNP= Family Nurse Practitioner, MD= Medical Doctor, DO= Doctor of Osteopathic Medicine.

Mean total scores improved from pretest to posttest for *information* with an increase of 62.5% to 81.2%. Table 2 lists the Information (Knowledge) items and scores.

TABLE 2. *Information (knowledge) about clinical skin examination.*

Survey Items	Pretest, Frequency Correct Answers	Pretest, Mean Percentage Correct Answers	Posttest, Frequency Correct Answers	Posttest, Mean Percentage Correct Answers
Incidence of melanoma in Arizona	5	83.3	6	100
Ethnic minorities with melanoma prognosis	5	83.3	6	100
Common presentation of melanoma on people of color	3	50	5	83.3
ABCDE rule	5	83.3	6	100
Melanoma risk factors	2	33.3	2	33.3
More than 11 nevi on right or left arm and relation to performing a head-to-toe skin examination	6	100	5	83.3
Body part women most likely get melanoma	1	16.7	4	66.7
Body part men most likely get melanoma	3	50	5	83.3
Total Mean Percentage Correct		62.5		81.2

Abbreviation: ABCDE= Asymmetry, Border, Color, Diameter, Evolution.

Overall scores improved from pretest to posttest for *motivation* with an increase of 3.81 to 3.98. Table 3 lists the items and scores for motivation.

TABLE 3. *Motivation to perform clinical skin examination.*

Item, Likert Scale: 1=Completely Disagree to 5=Completely Agree	Pretest Mean (SD) Score	Posttest Mean (SD) Score
1: CSE can be cost effective for melanoma detection if used with an appropriate population of patients.	4.17(1.17)	4.5(0.55)
2: CSE is too costly in terms of time to warrant its use.	3.83(1.17)	4.17(1.17)
3: Patients who are at high risk for melanoma should be referred to a dermatologist rather than have a CSE performed by a primary care provider.	2.67(1.21)	2.5(1.38)
4: Money should not be spent on melanoma detection for people of color.	4.83(0.41)	5(0)
5: There is insufficient evidence at this time for me to consider CSE as an appropriate melanoma detection option.	3.17(0.98)	4.17(0.75)
6: Widespread use of CSE will likely significantly increase rates of melanoma survival for underserved patients.	4.17(0.41)	4.67(0.52)
7: Patients who have a CSE are likely to pay attention to their skin lesions.	3.5(1.22)	1.83(0.98)
8: Conducting CSE for underserved patients is a priority in my practice.	3.67(1.21)	4.33(0.52)
9: Primary care providers who conduct CSE for underserved patients will have a significant impact on diagnosing melanoma early.	4.33(0.52)	4.67(0.52)
Overall Mean Score	3.81(1.10)	3.98(1.27)

Abbreviations: CSE= Clinical Skin Examination, SD= Standard Deviation. Items 2, 3, 4, & 5 were reverse coded before analysis.

Overall mean percentage of correct scores improved from pretest to posttest for *behavioral skills* for correctly ranking CSE order with an increase of 16.7% to 50%. Table 4 lists the items and scores for behavioral skills for CSE order.

TABLE 4. *Behavior skills for clinical skin examination.*

CSE Order	Pretest, Frequency of Correct Answers	Pretest, Mean Percent of Correct Answers	Posttest, Frequency of Correct Answers	Posttest, Mean Percent of Correct Answers
Correct	1	16.7	3	50

Overall scores improved from pretest to posttest for *behavioral skills* for skin lesion assessment with an increase of 70.8% to 71.9%. Table 5 lists the items and scores for behavioral skills for melanoma skin lesion assessment.

TABLE 5. *Behavior skills for melanoma skin lesion assessment.*

Cases	Pretest, Frequency of Correct Answers	Pretest, Mean Percent of Correct Answers	Posttest, Frequency	Posttest, Mean Percent of Correct Answers
Case 1	4	66.7	4	66.7
Case 2	6	100	6	100
Case 3	4	66.7	4	66.7
Case 4	3	50	1	16.7
Case 5	5	83.3	5	83.3
Case 6	6	100	6	100
Case 7	6	100	6	100
Case 8	6	100	6	100
Case 9	4	66.7	5	83.3
Case 10	4	66.7	4	66.7
Case 11	0	0	2	33.3
Case 12	5	83.3	4	66.7
Case 13	6	100	6	100
Case 14	3	50	3	50
Case 15	4	66.7	5	83.3
Case 16	2	33.3	2	33.3
Overall mean percentage correct		70.8		71.9

Note: Patients were asked if the lesions presented were suspicious or not suspicious.

The overall mean score improved from pretest to posttest for self-reported CSE *behavior change* from 1.33 to 9.50. Table 6 lists the item and scores for self-reported CSE behavior change.

TABLE 6. *Behavior change for performing clinical skin examinations in practice.*

Self-Reported Clinical Skin Examination Behavior	Pretest, Mean (SD)	Pretest, Range	Posttest, Mean (SD)	Posttest, Range
Approximately how many times did you conduct CSEs in practice these past two weeks?	1.33 (2.16)	0-5	9.50 (10.23)	2-30

Abbreviations: CSE= Clinical Skin Examination, SD= Standard Deviation.

DISCUSSION

Summary

The purpose of this DNP project was to provide a digital intervention to educate PCPs about CSE for melanoma for providers caring for underserved patients. All constructs of the IMB model that served as the theoretical basis for this project had scores that increased from pretest to posttest. This QI project intervention motivated participants to perform CSE during office visits when clinically indicated, improved information/knowledge and skills for assessing melanoma in underserved patient populations and led to self-reported CSE and skin lesion detection behavior. Thus, a sample of FNPs working in a health care organization who received a digitally delivered brief educational intervention demonstrated improved scores for knowledge, motivation, and skills to perform CSE for melanoma in underserved patients over a 2-week period. The self-reported mean increase in CSEs for melanoma (1.33 to 9.50) conducted by the participants of this project showcased that this intervention led to a self-reported increase in CSE behavior postintervention. Thus, enhanced early detection of melanoma in the underserved

patient population was seen at the organization, which may lead to better prognosis and outcomes.

Relationship to Framework

The proxy for information in this project was knowledge. Knowledge was measured by how much the participants learned about CSE for melanoma in underserved patient populations, risk factor assessment for melanoma, performance of a head-to-toe examination, and how to assess suspicious skin lesions. The overall scores for information from pretest to posttest improved from 62.5% to 81.2% with a net 18.7% increase. An acceptable score of information was determined to be 80% because CSE should be as clinically accurate as possible (Loescher et al., 2018). This project's posttest mean percentage score of 81% was an acceptable score.

Motivation in this project was defined as the personal attitudes towards the behavior change and the perceived social support for the behavioral change. Motivation was measured as the personal attitude about incorporating a CSE into a patient's office visit, performance of a CSE, assessment of suspicious skin lesions for at-risk patients and referral of patients with suspicious lesions to dermatologists, encouragement from the PCP work environment to perform CSEs, and reimbursement for performing CSEs in an underserved patient population. An acceptable score for motivation is greater than or equal to 3.5 (Walsh & Petroll, 2017). This DNP project showed that the score for motivation improved from 3.81 at pretest to 3.98 on posttest, exceeding the acceptable amount. Overall increase in motivation at an acceptable score showcases the FNPs' increased motivation to perform CSE for melanoma in underserved patient populations.

In this DNP project, behavioral skill was measured by ranking CSE order correctly and correctly assessing presented skin lesion cases. The overall mean correct percentage score increased 33.3% for the behavior skill ranking from pretest to posttest. Individually looking at the data showed the most commonly mistaken ranking order was picking the scalp, ears, postauricular folds, and back of neck first instead of ranking it correctly as second. FNPs may need more even more education on conducting a complete head to toe assessment. There was an overall 1.1% increased mean percentage score from pretest to posttest for the behavior skill of assessing skin lesions. However, the score after posttest was 71.9%, just below the ideal score of 80% (Loescher et al., 2018). Cases 11 and 16 had the lowest correct scores. The reason participants may have done poorly on case 11 is because the question stem states that the patient's mother has a history of melanoma. Family history of melanoma is a major risk factor for melanoma (ACS, 2019). However, this may have distracted the participants from focusing on the lesion image, which was not suspicious because it was a symmetric lesion with a regular border (ACS, 2019). Case 16 showcased a fibrous papule (not suspicious). In some cases, nonsuspicious lesions may be harder to identify as such. Often times, it is easy to identify highly suspicious lesions; however, it is the normal, non-suspicious lesions that are difficult to identify due to searching for entities in the images that are not actually a cause for concern (Clairwood et al., 2014). The results from Cases 11 and 16 revealed the possibility that these providers may need more training in skin lesion identification.

The concept of behavior change was operationalized by the self-reported change in CSE for melanoma. Participants self-reported a mean increase of 1.33 CSE on pretest to 9.5 CSE for melanoma two weeks post intervention. Based on overall increased scores of

information/knowledge, motivation, and behavior skills an assumption is that the intervention could be important for increasing CSE performance for underserved patient populations.

Three other studies reported similar digital interventions that measured participant knowledge and behavior post intervention. Goodman et al. (2018) found that using a digital intervention to educate NPs increased participant mean correct scores of skin cancer knowledge post intervention by 23.3%. This DNP project had an even higher increase in knowledge post intervention (33%). Goodman et al. (2018) also reported an increase in practice behaviors regarding skin cancer similar to the increased behavior change the participants reported post intervention for this DNP project. Hartnett and O'Keefe (2016) found that a 15-minute online educational intervention similarly increased participant knowledge and skin lesion identification. The study also reported that 70% of participants were more likely to change their practice behavior because they participated in the education program (Hartnett & O'Keefe, 2016). Since this study only measured participants' increased willingness to change their practice behavior it cannot be compared to self-reported actual behavior change reported by participants in this project. However, Hartnett and O'Keefe's (2016) finding of participants' willingness to change behavior supported the overall theme found in this DNP project: educating PCPs about CSE is imperative to help change the status quo in practice behavior in order to detect melanoma early in underserved patient populations. The best comparison of this DNP project's results and theory constructs, was a pilot study conducted by Stratton (2019), who found that brief education videos delivered digitally to teach FNPs about conducting CSE for melanoma were highly feasible. Stratton (2019) also reported a mean score of 11 for self-reported number of CSE, which was slightly higher than this project's post intervention mean score of 9.5. However, Stratton (2019)

used a posttest only design, which cannot detect change of the participants' baseline knowledge, information, behavior skills and self-reported CSE. Stratton's (2019) post intervention findings are comparable to those of this DNP project; both projects show promise for the intervention for FNPs.

Impact of Results on Practice

The UCHC FNP participants self-reported an increase in self-reported CSE behavior two weeks post intervention. Results of the study were emailed to the gatekeeper of the UCHC organization and to the participants regarding the improvement on scores from pretest to posttest. After two attempts, there was no response from the gatekeeper on how this intervention could be incorporated into the organization. However, four out of the six participants responded favorably and thought that the intervention should and could be sustained within the UCHC health care organization. For example, one participant stated, "I do think it is something that could be implemented at UCHC and that if you would like you could give us an educational presentation at one of our provider meetings." Presenting the videos at an upcoming UCHC provider meeting would be an opportunity to deliver the intervention about conducting CSEs for melanoma in underserved patient populations to all PCPs in the UCHC organization that did not participate in this DNP project. Another participant stated, "Certainly this is something I see the organization incorporating and certainly sustainable. In my experience, I have been using the recommendations with my patients and have discussed this with an FNP student currently doing [clinical] at our clinic. Your videos were very informative and helpful." The participants also stated that PCPs "are the front lines for catching skin cancer" and found the intervention "quite informative." This DNP project's intervention has the opportunity to continue to educate PCPs at

the UCHC organization working with underserved patient populations about conducting CSE for melanoma and will continue to positively impact practice change regarding CSE within the UCHC organization.

Strengths of Project

There were several strengths of this DNP project. One was a firm theoretical foundation of the intervention. The use of intervention components that were rigorously developed and previously tested for feasibility in the target participant population was a strength (Stratton, 2019). Development of an additional video that specifically targeted melanoma in underserved individuals added more depth to the existing videos, along with enhancing the generalizability of CSE to underserved populations. Retention rate for the project was 85.7%, representing loss of just one participant. This was a larger retention rate compared to similar studies. For example, the retention rates for Goodman et al. (2018), Hartnett and O'Keefe (2016), and Stratton (2019) were 45%, 71%, and 83% respectively. The attrition rate was just 14%, which was much better than similar studies. Another strength was that the REDCap technology provided an efficient way to quickly distribute the surveys and educational intervention to participants.

Limitations of Project

There were some limitations of this DNP project. One major limitation of the project was the longer than anticipated time to receive site authorization. This occurrence also delayed the UA's IRB approval process needed to start initiating recruitment strategies. Thus, there was a shorter time period available to recruit participants and could have affected the PI's ability to secure half of the organization's eligible providers to participate in the project. Another limitation of the project involved recruitment. Recruitment of participants was labor intensive,

requiring the PI to drive 159 miles and speak to PCPs in person at all seven of the rural Southern Arizona clinics and deliver flyers about the intervention. Another limitation involved the generalizability of the project's findings. No other PCP discipline besides FNPs completed participation in the DNP project. One male medical doctor (MD) enrolled in the project but failed to complete the education intervention and was unable to participate in the posttest survey. Additionally, all remaining six participants were female, decreasing the project's gender generalizability. UCHC also does not currently employ PAs, so those PCPs were not represented. These factors made the results more representative of FNP providers working in primary care and decreased generalizability to all types of PCPs.

A technology limitation occurred when the initial surveys and interventions were sent out. The intervention link to the first introductory segment video populated a survey that allowed participants to press a "submit" button and not view any or all of the additional videos. This problem was fixed by combining all links to the videos within one survey with clearer directions before they began. The fix enabled all participants who completed the pretest survey to watch all four brief intervention videos without difficulty. Another technology limitation to the project was the inability to officially check Vimeo to ensure that each participant actually watched all four videos or watched the entire video. Another limiting factor was the fact it was difficult to get enrolled participants to complete the pretest, educational intervention and posttest. Multiple reminders for the participants to complete each part of the project was a big undertaking and required a lot of time emailing, leaving phone messages, speaking to office staff and participants in person.

Conclusions

Dissemination

On a local level, dissemination occurred by submitting a report of the project's findings to the UCHC organization. On a regional level, the project will be submitted as an abstract for the Western Institute of Nursing Conference Research and Information Exchange. Nationally, this DNP project will be submitted as a manuscript for publication to the Journal of the Dermatology Nurses' Association, or the Journal for Nurse Practitioners (brief report), or the Journal of the American Association of Nurse Practitioners (QI Department).

Future Implications for Practice

PCPs such as FNPs commonly work with underserved patient populations that have a high risk of melanoma and a low likelihood of having a thorough CSE performed by PCPs (Chau et al., 2002; Wilde, Jones, Lewis, & Hull, 2013). Patients in underserved populations are more likely to have advanced melanoma diagnoses and lower survival rates due to infrequent CSE (Imahiyerobo-Ip et al., 2011; Korta et al., 2014). Thus, providers caring for underserved patients are a prime target for CSE instruction making the intervention from this project an ideal teaching solution. The results of this DNP project demonstrate the potential for an education tool that may improve PCPs' CSE skills and motivate PCPs to use those skills when caring for underserved patient populations. The next step would be to look at this intervention more rigorously in a RCT to see if there is an effect of the intervention on the outcomes, which is an essential way to relate how this intervention plays out in terms of evidence for practice (Polit & Beck, 2017). Once further testing is completed to ascertain evidence, there will be a clearer idea how strong the evidence is for the intervention (Heavey, 2019). This DNP project intervention potentially could

be used for continuing education credits and possibly integrated into health care organizations' PCP orientations in the future. This project's intervention is also being considered as part of the University of Arizona College of Nursing's 620A course, which is the DNP program's first clinical management course teaching students about skin conditions.

OTHER INFORMATION

Funding

The PI of this DNP project was a recipient of the Fall 2019 Mary Opal Wolanin Research Endowment.

APPENDIX A:
APPRAISAL OF EVIDENCE

Author/ Article	Qualitative: Concepts or phenomena Quantitative: Key Variables or Hypothesis Research Question	Theoretical Framework	Design	Sample (n)	Data Collection (Instruments/ Tools)	Findings
Ali et al. (2014)	The trained nurse would make appropriate referrals to dermatologists, require fewer skin biopsies, and detect and diagnose suspicious skin lesions more accurately.	None identified	Case study	n=1 ANP, who successfully completed a 6-month masters-level module in skin cancer nursing.	The participant received feedback from dermatology referrals she had made during the preceding years, undertook a dedicated period of observation of general dermatology clinics. Measures involved: proportion of patients seen in nurse-led clinic; proportion reviewed by consultant dermatologist; proportion requiring skin biopsy or surgery; proportion using sun-protective measures; proportion using 30% SPF or above; proportion diagnosed with NMSC.	The proportion of patients needing to be reviewed by the consultant dermatologist dropped from 53% to 31%. The proportion of patients requiring skin biopsy or surgery dropped from 22% to 6.5%. Patients diagnosed with NMSC dropped from 7% to 3%.

Blake et al. (2014)	Understand primary care NP attitudes, behaviors, and knowledge regarding skin cancer screening.	Social cognitive theory	Cross-sectional design	n=64, primary care NPs	29-item, multiple-choice online needs assessment adapted from an existing PCP survey included items on skin lesion assessment and CSE.	<p>Approximately 20%–30% did CSE during annual visits, and regularly referred patients to dermatologists.</p> <p>NP knowledge: 1% perceived level of knowledge as expert, 17% as substantial, 43% as basic to minimal, and 41% correctly identified the most common skin cancers that affect the face.</p> <p>CSE: 22% felt very or extremely confident in their ability to perform CSEs on their patients.</p> <p>Training: <10% felt very or extremely confident in their skills; 81% had no training on skin cancer early detection in the past year.</p>
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Bradley (2012)	<p>Implementation of a skin cancer screening tool in a primary care setting.</p> <p>(a)To explore if an educational program increases NP skin cancer screening knowledge.</p> <p>(b)To determine if NPs report enhanced physical assessment skills when applying a screening tool in clinical practice.</p> <p>(c)To determine if a skin cancer screening tool improves NP documentation during student physical exams.</p>	Health promotion model	Pilot study (pretest/posttest)	n=6, NPs, female, age 40-64	<p>Didactic skin cancer pre/posttest.</p> <p>Program evaluation questionnaire.</p> <p>UHC skin cancer screening tool documentation device.</p>	<p>223.4% increase in proper documentation of skin cancer screening and skin cancer patient education.</p> <p>Demonstrated that with proper training, NPs in primary care can screen for skin cancer effectively.</p>
DeKoninck et al. (2015)	Evaluate the feasibility of an FNP led annual skin cancer screening program.	None identified	Prospective Case study	n=37, Medically underserved patients at a free clinic in Marion, Indiana.	CSE performed by an FNP who had received CSE training by a dermatologist.	Suspicious lesions were discovered in 46% of participants (3 had BCC, 2 AK, and 3 with solar lentigos and keratosis, 0 with melanoma)

Goodman et al. (2018)	An online educational intervention to enhance nurse practitioner's skin cancer knowledge and behaviors.	American Academy of Dermatology U.S. Preventative Services Task Force, and the American Academy of Family Physicians Guidelines were chosen as a framework.	Pilot study (pretest/posttest)	n=30 NPs in Arizona	57 item pretest survey sent electronically, an 8-minute online video education intervention, and a 52-item posttest.	Skin cancer knowledge increased from pretest to posttest 23.33%. NPs reported an increase in practice behaviors regarding skin cancer.
Grange et al. (2014)	Efficacy of a GP training campaign for early detection of melanoma in France.	None identified	Pilot study (pretest/posttest)	n= 364 GPs	31 training sessions conducted by 27 trainer dermatologists. After training a CD-ROM covering all material, as well as a poster was given to participants.	Over 98% of GPs reported the training session improved their ability to recognize at-risk patients for melanoma and improved their ability to distinguish melanoma from benign lesions. Over 84% of GPs thought their active participation could improve early diagnosis of melanoma. Over 87% of participants wanted to receive additional information about melanoma regularly.
Harnett et al. (2016)	Increase skin cancer knowledge and lesion assessment through an online educational program.	Health Promotion Model	Pretest/posttest	n=10 NPs	16 item pretest, a 15 minute educational program, a 16-item posttest, and a five item evaluation.	All participants improved their scores from pretest to posttest on average by 25% (p<.0001). 70% of participants indicated that they were likely to change their practice after participation.

Markova et al. (2013)	Examine the effect of a web-based curriculum on early melanoma detection in primary care practice.	None reported	Randomized control trial	n= 57 PCPs n=3,341 patients of study's PCPs	BSCT course implemented as a web-based learning program. Control=A similar web-based course on weight assessment. PCP survey and chart reviews conducted as well as patient telephone interviews about their recent visit to their PCP at baseline, 1-2 months, and 12 months after course completion.	The positive changes in physician reported behaviors of: TBSE, intentions to discuss skin cancer detection, confidence performing TBSE. However, office practices and skin cancer knowledge did not correlate to differences in practice reported by their patients nor persisted in long term follow up.
Roebuck et al. (2015)	Utilizing the Roebuck SCAN tool to assess the current learning needs and educational preferences of NPs related to skin cancer detection.	Patricia Benner's theoretical framework of the novice to expert and Malcolm Knowles andragogy theory.	A cross-sectional design	n=272 NPs (32% were FNPs)	The Roebuck SCAN tool is comprised of a survey link consisting of 28 questions was emailed and responses were collected electronically. The survey was also provided at a conference in paper format (no information for how the answers were collected and entered with the electronically collected answers for data analysis).	Participants reported that they screened patients for skin cancer 49% of the time. 75% of participants reported having an advanced education curriculum related to melanoma early detection; however, only 22.4% reported attending any continuing education programs in the past year that shared information about melanoma. 84.2% would have liked additional learning activities related to melanoma. The second most popular educational tool desired for providers was online learning activities (46.3%).

Woodmansee et al. (2018)	Examine NP student knowledge and attitudes toward skin cancer assessments and skin lesion identification.	None mentioned	Exploratory descriptive design	n= 20 NP students	12 item demographic survey and 79 item KAP-SCA instrument survey.	30% of NP students never performed a clinical skin examination in clinical practice. 10% felt confident performing skin assessments. 70% of NP students did not agree that the dermatology training they received in their NP program prepared them for practice.
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Abbreviations: AK= actinic keratosis; ANP= advanced nurse practitioner; BCC= basal cell carcinoma; BSCT= basic skin cancer triage; CSE= clinical skin examination; GP= general practitioners; FNP= family nurse practitioner; FU= follow up; KAP-SCA= knowledge, attitudes and practice of skin cancer assessments; NMSC= non-melanoma skin cancer; NP= nurse practitioner; PCP=primary care provider; SCAN= skin cancer assessment of needs; UCHC=University of Connecticut health center

APPENDIX B:
RECRUITMENT FLYER



SEEKING PARTICIPANTS

A digital intervention to educate primary care providers to perform clinical skin examination for melanoma in underserved patients

Are you an FNP, MD, or DO working at UCHC?

Interested in learning about how to conduct a clinical skin examination to detect suspicious skin lesions early such as melanoma?

Hi my name is Kyla Diesner and I am a Doctor of Nursing Practice (DNP)-Family Nurse Practitioner (FNP) student. I am conducting a DNP project that involves primary care providers (PCPs) who specifically work with underserved patient populations. This project has been approved by the University of Arizona's Human Subjects Protection Program IRB. For my intervention, I plan to deliver 4 brief online videos about conducting a clinical skin examination to see if this intervention improves PCPs' clinical skin examination knowledge and skills to detect melanoma early. I will ask you to watch the videos and complete an online survey before and after watching the videos. All participants who complete the intervention will receive a \$25 Amazon gift card. Would you be interested in participating in my project? Thank you so much for your time, and I look forward to hearing from you!

Kyla Diesner, MS, RN
FNP-DNP Student, Class of 2019
University of Arizona College of Nursing



APPENDIX C:
INTRODUCTORY SEGMENT VIDEO SCRIPT

DNP Project Script

Slide 1: Introduction to the Series of Modules

Welcome to an introductory segment that serves as a preface for modules about melanoma risk assessment, head-to-toe skin examination, and skin lesion assessment.

Slide 2: Introduction Slide: Melanoma in Underserved Patient Populations

This introductory segment is designed to educate primary care providers on the seriousness of melanoma in underserved populations, and importance of clinical skin examinations often abbreviated as CSEs to detect melanoma in underserved patients. Melanoma is the most serious of all skin cancers. We know little about melanoma in underserved populations, but what is known is that early diagnosis of melanoma decreases mortality by more than 90% (Fleming, Grade, & Bendavid, 2018). Primary care providers usually are the first to detect suspicious skin lesions in patients during routine clinical visits. CSEs give providers working with underserved patients an important opportunity to catch melanoma early and save lives (Fleming et al., 2018).

Slide 3: Learning Objectives

Please take a moment to review the objectives for this introductory segment.

Slides 4-6: Statistics/ Magnitude of the Problem

Skin cancer in the United States is the most commonly diagnosed cancer and constitutes a public health burden (American Cancer Society [ACS], 2019). Over 1 million people in the U.S. are living with melanoma; of these, approximately 2,000 are Arizonans (Arizona Department of Health Services [ADHS], 2017). Melanoma incidence has been rising in the U.S. for the last 30 years (ACS, 2019). For example, melanoma in Arizona has increased over 80% in the last decade (Arizona Department of Health Services [ADHS], 2017). Overall lifetime risk of melanoma is about 3% for whites, and about 1% for Blacks and Hispanics (ACS, 2019). In Arizona this year, close to 16% of patients diagnosed with melanoma were non-white (ADHS, 2019).

Slides 7-8: Underserved Populations

Underserved populations include Americans who have an income below the Federal poverty line (\$12,490 for an individual) or live in a geographically isolated location, which limits their access to primary health care services (Health Resources & Services Administration

[HRSA], 2016; U.S. Department of Health & Human Services [USDHHS], 2019). Specifically, the homeless, low income, Medicaid-eligible, Native American, and migrant farmworker populations are considered underserved and face linguistic, economic, and/or cultural barriers to health care (HRSA, 2016).

Slide 9: Underserved Hispanic Population

Currently there is a rising incidence of melanoma among Hispanics, a growing minority population in the U.S. who typically present with advanced stages of disease and experience higher melanoma mortality rates than non-Hispanics (Chung et al., 2015; Coups et al., 2013; Harvey, Oldfield, Chen, & Eschbach, 2016). Hispanics have the highest incidence of the acral lentiginous type of melanoma, which typically appears on the palms of the hands, the soles of the feet, or under the nails. People of all races, skin color and sociodemographics benefit from CSEs for melanoma (Wu et al., 2011).

Slide 10: Question to Increase Engagement/Key Information Recap

Please answer the following question before proceeding to the rest of the segment. An underserved population at known increasing risk for melanoma is: a) Native American, b) Hispanic, c) Homeless, or d) Low Income. Correct, the right answer is b) Hispanics.

Slides 11-12: Common Myths

Before delving into CSEs, let's clarify three common myths about melanoma. **Myth:** Melanoma only occurs in people with light skin who sunburn easily. **Fact:** Melanoma can occur in people of color (Sigh et al., 2011). Acral lentiginous melanoma is the most common type of melanoma among people of darker skin (Clairwood, Ricketts, Grant-Kels, & Gonsalves, 2014; Hu et al., 2014). **Myth:** Clinical skin examinations for melanoma do not need to be conducted for people of color. **Fact:** People of color should have CSEs (Harvey et al., 2016; Korta, Saggar, Wu, & Sanchez, 2014). Studies have found that lower socioeconomic status and racial/ethnic minority status were associated with a lower likelihood of patients receiving a recent CSE (Cormier et al., 2006; Harvey et al., 2016; Miller et al., 2015; Sigh et al., 2011). **Myth:** Melanoma develops only from moles. **Fact:** Melanoma can develop from new growths also known as de novo anywhere on the skin without first presenting as a mole (Harvey, 2018). Over 70% of melanomas develop from new growths (Pampena et al., 2017).

Slide 13: Application in Your Practice

Now that we have looked at the magnitude of the problem in underserved populations and addressed common misconceptions, it's time to apply this awareness in our practice. Patients in underserved populations with darker skin tones are more likely to have advanced skin cancer diagnoses and lower survival rates because of infrequent CSEs (Imahiyerobo-Ip et al., 2011; Korta et al., 2014). The CSE procedure is the same for everyone (U.S. Preventive Services Task Force [USPTF], 2016).

Slide 14: Clinical Skin Examination for Melanoma in People of Color and Summary

However, when primary care providers are conducting a CSE for people of color, they need to focus on the nail beds, palms of the hands, soles of the feet, and between the fingers and toes (Imahiyerobo-Ip, Ip, Jamal, Nadiminti, & Sanchez, 2011; USPTF, 2016). These are places with decreased pigmentation for people of color and are easily overlooked (Imahiyerobo-Ip et al., 2011). Acral lentiginous melanoma is the type of melanoma that would be more likely to find in these places (Clairwood et al., 2014; Hu et al., 2014).

Conducting CSEs for melanoma is important, even for underserved patients and people of color. Conducting CSEs within your daily practice doesn't need to be a hassle; it is just another important step to include in your routine for patients. The next three modules covering melanoma risk assessment, procedures for conducting a whole-body head-to-toe skin examination, and skin lesion assessment were created and previously tested for feasibility and acceptability at the University of Arizona.

Slide 15: Transition to Next Three Modules

Please proceed to the first module to learn more about melanoma risk assessment.

APPENDIX D:
INTRODUCTORY SEGMENT VIDEO STORYBOARD

MELANOMA IN UNDERSERVED PATIENTS

Introductory Segment



MELANOMA IN UNDERSERVED PATIENTS



- Important for Primary Care Providers to conduct Clinical Skin Examinations (aka CSEs) for melanoma
- Melanoma is the most serious of all skin cancers
- **Early diagnosis decreases mortality by >90%**

Learning Objectives

- Have an awareness of the magnitude of the problem of melanoma in underserved patients
- Describe the importance of conducting clinical skin examinations (CSE) for underserved patients
- Identify at least 3 common sites that melanoma presents on people of color





Magnitude of the Problem

- Lifetime risk for melanoma:
 - White: 2.6% (1 in 38)
 - Black: 0.58% (1 in 172)
 - Hispanic: 0.58% (1 in 172)
- Melanoma in Arizona:
 - Increased 87% between 2010-2016
 - 16% non-white



Underserved populations

- Income below the Federal poverty line:
 - \$12,490 for an individual
- Live in a Geographically Isolated Location:
 - Limits access to primary health care services



Underserved Populations

- Homeless
- Medicaid Eligible
- Low Income
- Native Americans
- Migrant Farmworkers



Underserved Hispanic Population



populations



Key Information Recap

- An underserved population at known increasing risk for melanoma is:
 - a) Native American
 - b) Hispanic*****
 - c) Homeless
 - d) Low income



COMMON MYTHS



Common Myths

- **MYTH:** Melanoma only occurs in people with light skin who sunburn easily
 - **FACT:** Melanoma can occur in people of color. Acral lentiginous melanoma is the most common type of melanoma among people of darker skin.
 - **MYTH:** Clinical skin examinations for melanoma do not need to be conducted for people of color
 - **FACT:** People of color should have CSEs. Studies have found that lower socioeconomic status and racial/ethnic minority status were associated with a lower likelihood of patients receiving a recent CSE.
 - **MYTH:** Melanoma develops only from moles
 - **FACT:** Melanoma can develop from new growths also known as de novo anywhere on the skin without first presenting as a mole. Over 70% of melanomas develop from new growths.
- 

Application in Your Practice

Clinical Skin Examination for Melanoma in People of Color

- **Focused attention on places that are lacking more in pigmentation:**
 - Nail Beds
 - Palms of Hands
 - Soles of Feet
 - Between fingers and toes



Melanoma image courtesy of
Dr. Lois Loescher, PHD, RN, FAAN



**Please proceed to the first
module to learn more about
melanoma risk assessment**



APPENDIX E:
REDCAP WORKSHOP COMPLETION CERTIFICATES



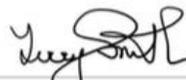


Certificate of Completion

This is to certify that

Ryla Diesner

has successfully completed
REDCap Advanced Workshop on June 20, 2019



Terry Smith



THE UNIVERSITY OF ARIZONA HEALTH SCIENCES
Center for Biomedical
Informatics & Biostatistics

APPENDIX F:
DATA COLLECTION INSTRUMENTS

PRETEST SURVEY

This survey asks you questions about clinical skin examination (CSE) for melanoma, which is comprised of a melanoma risk assessment, head-to-toe skin examination, and skin lesion assessment. Please respond to each item to the best of your ability.

Coding Criteria:

What are the last 4 numbers of your cell phone number? (for coding purposes only) _ _ _ _

Demographics:

What is your gender?

- a) Female
- b) Male
- c) Other

What is your age? _____ years

What type of provider license do you hold?

- a) FNP
- b) MD
- c) DO

How many years of experience do you have as a primary care provider? _____ years

Practice Data:

What percentage of your patients are underserved?

- a) 0-25%
- b) 26-50%
- c) 51-75%
- d) 76-100%

What is the predominant ethnicity of your patient population?

- a) Not Hispanic or Latino
- b) Hispanic or Latino

What is the predominant race of your patient population?

- a) White
- b) Black or African American
- c) American Indian or Alaskan Native

- d) Asian
- e) Native Hawaiian or Pacific Islander

Section 1: Information about melanoma (8 items) adapted from Walsh and Petroll (2017) and Stratton (2019).

Please select the correct answer:

1. The incidence of melanoma in Arizona is:
 - a) Declining
 - b) Staying the same
 - c) Increasing*
 - d) Don't know/Unsure

2. True or false, ethnic minorities diagnosed with melanoma have a worse prognosis.
 - a) True*
 - b) False

3. Where does melanoma commonly present on people of color?
 - a) Non-sun-exposed areas of the skin*
 - b) Arms
 - c) Head and neck
 - d) Lower legs

4. Which of the following is **NOT TRUE** about the ABCDEs:
 - a) A= asymmetry
 - b) B= border
 - c) C= crusting*
 - d) D= diameter
 - e) E= evolution

5. Which of the following are melanoma risk factors? (Select all that apply)
 - a) Skin type I*
 - b) Family history of melanoma*
 - c) HPV exposure
 - d) History of sunburn*

6. Patients with more than 11 nevi on their arm should have a head-to-toe skin examination.
 - a) True*
 - b) False

7. Women are more likely to get melanoma on which body site?
 - a) Back/Chest
 - b) Upper extremities

- c) Lower extremities*
- d) Scalp

8. Men are more likely to get melanoma on which body site?
- a) Back/Chest*
 - b) Upper extremities
 - c) Lower extremities
 - d) Scalp

Section 2: Motivation (9 items) adapted from Walsh & Petroll (2017) and Stratton (2019).

Please mark the one response to each item that best reflects your motivation. There are no right or wrong answers.

Items are scored on Likert-type scales with response options ranging from 1 (low anchor) to 5 (high anchor): 1 2 3 4 5

1. CSE can be cost-effective for melanoma detection if used with an appropriate population of patients. (1= completely disagree, 5= completely agree)
2. CSE is too costly in terms of time to warrant its use. (5= completely disagree, 1= completely agree)
3. Patients who are at high risk for melanoma should be referred to a dermatologist rather than have a CSE performed by a primary care provider. (5= completely disagree, 1= completely agree)
4. Money should not be spent on melanoma detection for people of color. (5= completely disagree, 1= completely agree)
5. There is insufficient evidence at this time for me to consider CSE as an appropriate melanoma detection option. (5= completely disagree, 1= completely agree)
6. Widespread use of CSE will likely significantly increase rates of melanoma survival for underserved patients. (1= completely disagree, 5= completely agree)
7. Patients who have a CSE are likely to pay attention to their skin lesions. (1= completely disagree, 5= completely agree)
8. Conducting CSE for underserved patients is a priority in my practice. (1= completely disagree, 5= completely agree)
9. Primary care providers who conduct CSE for underserved patients will have a significant impact on diagnosing melanoma early. (1= completely disagree, 5= completely agree)

Section 3: Behavioral Skills (17 items) adapted from Stratton (2019) and Loescher (2019).

Head-to-Toe Skin Examination

Please rank the following steps of a head-to-toe skin examination in correct order (1 to 8):

- a) Underarms, palms, fingernails #4
- b) Head and neck #1
- c) Legs and feet #7
- d) Heels, between toes, toenails #8
- e) Scalp, ears, postauricular folds, back of neck #2
- f) Back, buttocks #5
- g) Groin #6
- h) Arms, hands, chest, abdomen #3

16-Item Skin Lesion Assessment

Please use the ABCDE rule to assess whether the following skin lesions are suspicious or not suspicious.

Case 1: A 52-year-old man presents to the clinic. You are concerned with the appearance of the lesion on the shoulder and wonder whether to refer him to a dermatologist.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: Lesion is asymmetric, borders are irregular. This is melanoma.)
- b) Not suspicious

Case 2: You notice a lesion on the left thigh of a new patient, a 32-year old truck driver. The lesion has not bothered her, but has slowly enlarged, thickened, and gotten darker since she first noticed it around 1 year ago.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: Both lesions are asymmetric, have an irregular border, have variegated and uneven pigment. The patient noticed a change over time. The left lesion is ulcerated. These are melanomas.)
- b) Not suspicious

Case 3: You spot a lesion on a 54-year old woman's back. This patient is not aware of the presence of the lesion, which does not seem to bother her at all.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: This lesion is symmetric, has an even border, is evenly colored, is non-ulcerated. The lesion is a seborrheic keratosis, which is indicative of UVR damage. It is not a skin cancer.)

Case 4: This lesion has been growing slowly for about 2 years on the back of a new patient, a 49-year old woman. It does not bother her, but she is concerned because it has an odd shape.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: Although this lesion looks concerning, it is uniformly colored, nonulcerated, and is in a sun-exposed area. This lesion is a seborrheic keratosis, indicative of sun damage.)

Case 5: One of your patients is concerned about a lesion on the arm, which has been enlarging over several years. He says it does not bother him and he has other similar lesions on the legs.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: This lesion is on a sun-exposed area, is symmetric, and evenly colored. This is a seborrheic keratosis.)

Case 6: A new patient, a 53-year old man, has a slowly growing lesion on the chest wall. He has other pigmented spots on his trunk, but none has this appearance (“ugly duckling”). He said it’s been there so long that “I don’t even notice it.”



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: This lesion has the classic “ugly duckling” appearance of a melanoma. It is asymmetric, has irregular borders, variegated color, is ulcerated, and obviously very large. This is melanoma.)
- b) Not suspicious

Case 7: This 56-year old man, a regular client, has had a flat spot on his chest for several years. You notice that it has suddenly started to enlarge and change color.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: This spot is asymmetric, has irregular borders, variegated colors and shows ulceration. The most important feature is that you notice it changing. This lesion is melanoma.)
- b) Not suspicious

Case 8: You are inspecting the feet of a 61-year-old African American male and notice a change in the color on the bottom of his foot. He says that he never looks at the bottom of his feet and did not know it was there.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: People of color tend to have less pigment on their feet and may develop a type of melanoma on the bottoms of feet, hands and nailbeds. This is melanoma.)
- b) Not suspicious

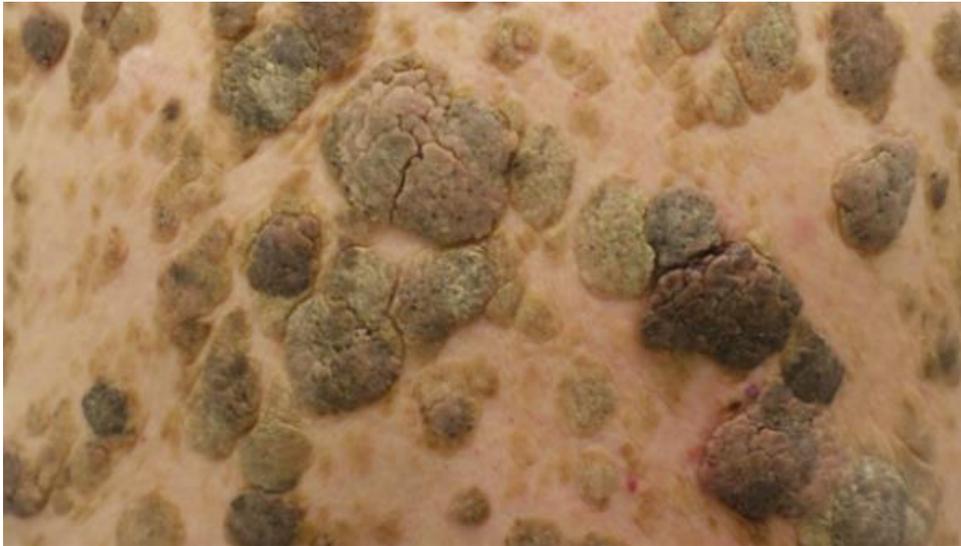
Case 9: This 68-year-old man has been a client for several years and you notice that this brown lesion on his cheek is very slowly enlarging. He is retired now but worked outside his entire adult life as a farmer.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: This is a slow-growing form of melanoma that tends to occur in highly sun-exposed areas and in older adults.)
- b) Not suspicious

Case 10: A 90-year-old patient is still very active and spends a lot of time outside. He says he has had growths on his skin for decades. A few of them have become very irritated and have bled on occasion.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: Although these lesions look concerning, there are multiple lesions that have a fairly uniform border. They are raised, non-ulcerated and are a sign of a lifetime of skin damage from ultraviolet radiation (UVR). These lesions are seborrheic keratoses.)

Case 11: You notice a mole on the shoulder of a 24-year-old who says that it has darkened lately. Her mother has a history of skin cancer.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: This is a symmetric lesion with a regular border, with even color and no ulceration. This is a nevus or mole.)

Case 12: A 27-year-old man has developed dark spots on his shoulders over the past few years. They don't bother him. He tells you that he previously worked as a landscaper and had very significant sun exposure.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: This illustrates sun damage that can occur at a young age. This client could be at risk of future skin cancer. These lesions are solar keratoses.)

Case 13: During a CSE a 44-year-old woman has a lesion on her low back, and you note that there is no other lesion on her skin that looks like it.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: This lesion is asymmetric, has irregular borders, variegated color. This also has the “ugly duckling” appearance.)
- b) Not suspicious

Case 14: You have noticed these moles on a 36-year-old patient’s chest while listening to their heart. She tells you that her grandfather recently died of melanoma. She has no personal history of abnormal moles or melanoma.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: These moles are symmetric, even bordered and colored, and are not ulcerated. They do not appear to be changing over time.)

Case 15: This 24-year-old woman has had a mole on her left eyebrow since she was a small child. She thinks that the lesion is starting to grow.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (This is a normal nevus or mole.)

Case 16: This is a 41-year-old man has had this growth on his nose for several months. He says it never bothers him and it has never bled.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: This is a fibrous papule.)

Behavior (4 items)

Please respond to the following statements to the best of your ability.

1. Approximately how many times did you conduct a clinical skin examination (CSE) in practice the past two weeks? (A CSE includes a melanoma risk assessment, head-to-toe skin examination and suspicious skin lesion assessment)
2. Approximately how many times did you conduct a melanoma risk assessment the past two weeks?
3. Approximately how many times did you conduct a head-to-toe skin examination for melanoma the past two weeks?
4. Approximately how many skin lesions did you assess the past two weeks?

POSTTEST SURVEY

This survey asks you questions about clinical skin examination (CSE) for melanoma, which is comprised of a melanoma risk assessment, head-to-toe skin examination, and skin lesion assessment. Please respond to each item to the best of your ability.

Coding Criteria:

What are the last 4 numbers of your cell phone number? (For coding purposes only) _ _ _ _

Section 1: Information about melanoma (8 items) adapted from Walsh and Petroll (2017) and Stratton (2019).

Please select the correct answer.

1. The incidence of melanoma in Arizona is:
 - a) Declining
 - b) Staying the same
 - c) Increasing*
 - d) Don't know/Unsure
2. True or false, ethnic minorities diagnosed with melanoma have a worse prognosis.
 - a) True*
 - b) False
3. Where does melanoma commonly present on people of color?

- a) Non-sun-exposed areas of the skin*
 - b) Arms
 - c) Head and neck
 - d) Lower legs
4. Which of the following is **NOT TRUE** about the ABCDEs:
- a) A= asymmetry
 - b) B= border
 - c) C= crusting*
 - d) D= diameter
 - e) E= evolution
5. Which of the following are melanoma risk factors? (Select all that apply)
- a) Skin type I
 - b) Family history of melanoma
 - c) HPV exposure*
 - d) History of sunburn
6. Patients with more than 11 nevi on their arm should have a head to toe skin examination.
- a) True*
 - b) False
7. Women are more likely to get melanoma on which body site?
- a) Back/Chest
 - b) Upper extremities
 - c) Lower extremities*
 - d) Scalp
8. Men are more likely to get melanoma on which body site?
- a) Back/Chest*
 - b) Upper extremities
 - c) Lower extremities
 - d) Scalp

Section 2: Motivation (9 items) adapted from Walsh & Petroll (2017) and Stratton (2019).

Please mark the one response to each item that best reflects your motivation. There are no right or wrong answers.

Items are scored on Likert-type scales with response options ranging from 1 (low anchor) to 5 (high anchor): 1 2 3 4 5

- 1.) CSE can be cost effective for melanoma detection if used with an appropriate population of patients. (1= completely disagree, 5= completely agree)
- 2.) CSE is too costly in terms of time to warrant its use. (5= completely disagree, 1= completely agree)
- 3.) Patients who are at high risk for melanoma should be referred to a dermatologist rather than have a CSE performed by a primary care provider. (5= completely disagree, 1= completely agree)
- 4.) Money should not be spent on melanoma detection for people of color. (5= completely disagree, 1= completely agree)
- 5.) There is insufficient evidence at this time for me to consider a CSE as an appropriate melanoma detection option. (5= completely disagree, 1= completely agree)
- 6.) Widespread use of CSE will likely significantly increase rates of melanoma survival for underserved patients. (1= completely disagree, 5= completely agree)
- 7.) Patients who have a CSE are likely to pay attention to their skin lesions. (1= completely disagree, 5= completely agree)
- 8.) Conducting CSE for underserved patients is a priority in my practice. (1= completely disagree, 5= completely agree)
- 9.) Primary care providers who conduct CSE for underserved patients will have a significant impact on diagnosing melanoma early. (1= completely disagree, 5= completely agree)

Section 3: Behavioral Skills (17 items) adapted from Stratton (2019) and Loescher (2019).

Steps to a head-to-toe skin examination

Please rank the following steps of a head-to-toe skin examination in order (1 to 8):

- a) Underarms, palms, fingernails #4
- b) Head and neck #1
- c) Legs and feet #7
- d) Heels, between toes, toenails #8
- e) Scalp, ears, postauricular folds, back of neck #2
- f) Back, buttocks #5
- g) Groin #6
- h) Arms, hands, chest, abdomen #3

16-Item Skin Lesion Assessment

Please use the ABCDE rule to assess whether the following skin lesions are suspicious or not suspicious.

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Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: Lesion is asymmetric, borders are irregular. This is melanoma.)
- b) Not suspicious

Case 2: You notice a lesion on the left thigh of a new patient, a 32-year old truck driver. The lesion has not bothered her, but has slowly enlarged, thickened, and gotten darker since she first noticed it around 1 year ago.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: Both lesions are asymmetric, have an irregular border, have variegated and uneven pigment. The patient noticed a change over time. The left lesion is ulcerated. These are melanomas.)
- b) Not suspicious

Case 3: You spot a lesion on a 54-year old woman's back. This patient is not aware of the presence of the lesion, which does not seem to bother her at all.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: This lesion is symmetric, has an even border, is evenly colored, is non-ulcerated. The lesion is a seborrheic keratosis, which is indicative of UVR damage. It is not a skin cancer.)

Case 4: This lesion has been growing slowly for about 2 years on the back of a new patient, a 49-year old woman. It does not bother her, but she is concerned because it has an odd shape.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: Although this lesion looks concerning, it is uniformly colored, nonulcerated, and is in a sun-exposed area. This lesion is a seborrheic keratosis, indicative of sun damage.)

Case 5: One of your patients is concerned about a lesion on the arm, which has been enlarging over several years. He says it does not bother him and he has other similar lesions on the legs.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: This lesion is on a sun-exposed area, is symmetric, and evenly colored. This is a seborrheic keratosis.)

Case 6: A new patient, a 53-year old man, has a slowly growing lesion on the chest wall. He has other pigmented spots on his trunk, but none has this appearance (“ugly duckling”). He said it’s been there so long that “I don’t even notice it.”



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: This lesion has the classic “ugly duckling” appearance of a melanoma. It is asymmetric, has irregular borders, variegated color, is ulcerated, and obviously very large. This is melanoma.)
- b) Not suspicious

Case 7: This 56-year old man, a regular client, has had a flat spot on his chest for several years. You notice that it has suddenly started to enlarge and change color.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: This spot is asymmetric, has irregular borders, variegated colors and shows ulceration. The most important feature is that you notice it changing. This lesion is melanoma.)
- b) Not suspicious

Case 8: You are inspecting the feet of a 61-year-old African American male and notice a change in the color on the bottom of his foot. He says that he never looks at the bottom of his feet and did not know it was there.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: People of color tend to have less pigment on their feet and may develop a type of melanoma on the bottoms of feet, hands and nailbeds. This is melanoma.)

b)Not suspicious

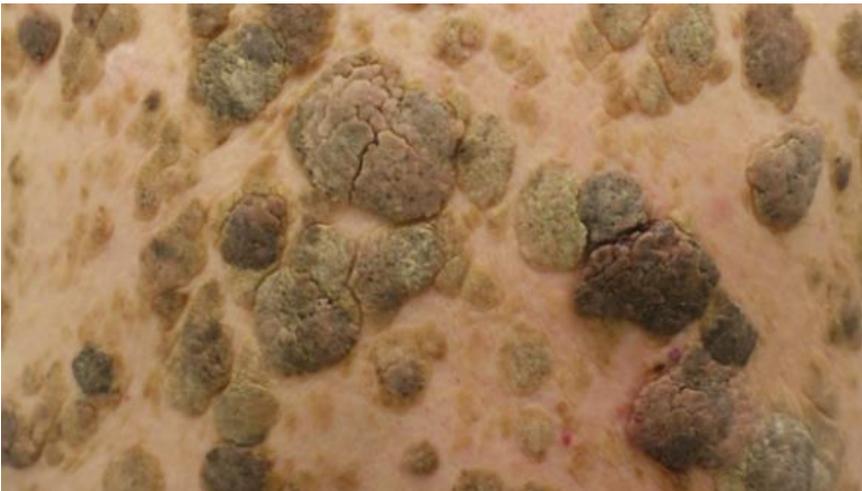
Case 9: This 68-year-old man has been a client for several years and you notice that this brown lesion on his cheek is very slowly enlarging. He is retired now but worked outside his entire adult life as a farmer.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: This is a slow-growing form of melanoma that tends to occur in highly sun-exposed areas and in older adults.)
- b) Not suspicious

Case 10: A 90-year-old patient is still very active and spends a lot of time outside. He says he has had growths on his skin for decades. A few of them have become very irritated and have bled on occasion.



Is the lesion above suspicious or not suspicious?

- a) Suspicious

- b) Not suspicious* (Correct: Although these lesions look concerning, there are multiple lesions that have a fairly uniform border. They are raised, non-ulcerated and are a sign of a lifetime of skin damage from ultra violet radiation (UVR). These lesions are seborrheic keratoses.)

Case 11: You notice a mole on the shoulder of a 24-year-old who says that it has darkened lately. Her mother has a history of skin cancer.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
 b) Not suspicious* (Correct: This is a symmetric lesion with a regular border, with even color and no ulceration. This is a nevus or mole.)

Case 12: A 27-year-old man has developed dark spots on his shoulders over the past few years. They don't bother him. He tells you that he previously worked as a landscaper and had very significant sun exposure.



Is the lesion above suspicious or not suspicious?

- a) Suspicious

b)Not suspicious* (Correct: This illustrates sun damage that can occur at a young age. This client could be at risk of future skin cancer. These lesions are solar keratoses.)

Case 13: During a CSE a 44-year-old woman has a lesion on her low back, and you note that there is no other lesion on her skin that looks like it.



Is the lesion above suspicious or not suspicious?

- a) Suspicious* (Correct: This lesion is asymmetric, has irregular borders, variegated color. This also has the “ugly duckling” appearance.)
- b) Not suspicious

Case 14: You have noticed these moles on a 36-year-old patient’s chest while listening to their heart. She tells you that her grandfather recently died of melanoma. She has no personal history of abnormal moles or melanoma.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: These moles are symmetric, even bordered and colored, and are not ulcerated. They do not appear to be changing over time.)

Case 15: This 24-year-old woman has had a mole on her left eyebrow since she was a small child. She thinks that the lesion is starting to grow.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (This is a normal nevus or mole.)

Case 16: This is a 41-year-old man has had this growth on his nose for several months. He says it never bothers him and it has never bled.



Is the lesion above suspicious or not suspicious?

- a) Suspicious
- b) Not suspicious* (Correct: This is a fibrous papule.)

Section 4: Behavior Change (4 items)

Please answer the following statements:

Approximately how many times did you conduct CSEs in practice these past two weeks?

Approximately how many times did you conduct a melanoma risk assessment in practice these past two weeks?

Approximately how many times did you conduct a head-to-toe skin examination for melanoma these past two weeks?

Approximately how many skin lesions did you assess these past two weeks?

Thank you very much for participating in this DNP project. You will receive a link to a \$25 Amazon gift card within the week for participating and completing this project. References and answers to the survey questions will be emailed as well.

APPENDIX G:
CONSENT FORM

A digital intervention to educate primary care providers to perform clinical skin examination for melanoma in underserved patients.

Kyla Jean Diesner

The purpose of this project is to provide a digital intervention that educates primary care providers (PCPs) about clinical skin examination (CSE) for melanoma in underserved patient populations. This quality improvement project will examine whether this intervention motivates PCPs to perform CSE during office visits when clinically indicated, improves PCPs' knowledge and skills for assessing and referring suspicious skin lesions in underserved patient populations, and leads to self-reported CSE of patients in practice.

If you choose to take part in this project, you will be asked to complete an initial survey, assessing your CSE knowledge, motivation, skills and performance behavior, watch four brief education videos on CSE, and complete a survey two weeks after finishing the intervention. It will take approximately 20 minutes to complete each survey, and approximately 20 minutes to watch the 4 online videos. You are expected to watch the online videos over a one-week period. There are no foreseeable risks associated with participating in this project. You may gain knowledge and motivation to conduct a CSE when appropriate during office visits, which may lead to detecting melanoma early and improve patient outcomes. Surveys are coded and your responses are confidential.

If you choose to participate in the project, participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may withdraw at any time from the project. By participating, you do not give up any personal legal rights you may have as a participant in this project.

For questions, concerns, or complaints about the project, you may call or email Kyla Diesner.

APPENDIX H:

UNITED COMMUNITY HEALTH CENTER (UCHC) SITE AUTHORIZATION



UNITED COMMUNITY HEALTH CENTER - MARIA AUXILIADORA, INC.

June 12, 2019

University of Arizona Institutional Review Board
c/o Office of Human Subjects
1618 E Helen St
Tucson, AZ 85721

Please note that Mrs. Kyla Jean Diesner, UA Graduate Student, has permission from United Community Health Center to conduct her Quality Improvement Project at our primary care clinics for her study, "A digital intervention to educate primary care providers to perform clinical skin examination for melanoma in underserved patients."

Mrs. Diesner will contact primary care providers to recruit them by approaching them during her clinical rotations, and by word of mouth from her preceptor. Emails of participants interested will be obtained by Mrs. Diesner herself or from her preceptor Mrs. Hannah Vogan-D'Arezzo, FNP-C. Mrs. Diesner's surveys and online video interventions will be delivered via email. Her plan is to send emails to participants by the first week of August.

Mrs. Diesner has agreed to provide to my office a copy of the University of Arizona IRB-approved, stamped consent document before she recruits participants at UChC, and will also provide a copy of aggregate results.

If there are any questions, please contact my office.

Signed,

Wendy Kibby, RN, BSN, MHA
Chief Operations Officer

1260 S. CAMPBELL ROAD, BLDG 2
GREEN VALLEY, ARIZONA 85614

PHONE (520) 407-5600 • FAX (520) 625-8504

UNITED COMMUNITY HEALTH CENTER - MARIA AUXILIADORA, INC. IS A 501(c)(3), NON-PROFIT COMMUNITY HEALTH CENTER

APPENDIX I:
THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD APPROVAL
LETTER


 Human Subjects
 Protection Program

 1618 E. Helen St.
 P.O.Box 245137
 Tucson, AZ 85724-5137
 Tel: (520) 626-6721
<http://rgw.arizona.edu/compliance/home>

Date: July 05, 2019

Principal Investigator: Kyla Jean Diesner

Protocol Number: 1906742303

Protocol Title: A digital intervention to educate primary care providers to perform clinical skin examination for melanoma in underserved patients.

Determination: Human Subjects Review not Required

Documents Reviewed Concurrently:

HSPF Forms/Correspondence: *KylaDiesner_DeterminationofHumanResearch.pdf*

Regulatory Determinations/Comments:

- Not Research as defined by 45 CFR 46.102(l): As presented, the activities described above do not meet the definition of research cited in the regulations issued by U.S. Department of Health and Human Services which state that "Research means a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge. Activities that meet this definition constitute research for purposes of this policy, whether or not they are conducted or supported under a program that is considered research for other purposes. For example, some demonstration and service programs may include research activities. For purposes of this part, the following activities are deemed not to be research."

The project listed above does not require oversight by the University of Arizona.

If the nature of the project changes, submit a new determination form to the Human Subjects Protection Program (HSPF) for reassessment. Changes include addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the study activity. Please contact the HSPF to consult on whether the proposed changes need further review.

The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).

REFERENCES

- Ali, F. R., Samarasinghe, V., Russel, S. A., & Lear, J. T. (2014). Increasing capacity for skin surveillance in a transplant review clinic. *Transplant Journal*, 97(8), 48-50. doi: 10.1097/TP.0000000000000084
- American Cancer Society. (2019). Key statistics for melanoma skin cancer. Retrieved from <https://www.cancer.org/cancer/melanoma-skin-cancer/about/key-statistics.html>
- Arizona Department of Health Services. (2017, November). Arizona melanoma profile. Retrieved from <https://azdhs.gov/documents/preparedness/public-health-statistics/cancer-registry/reports/arizona-melanoma-profile-2017.pdf>
- American Nurses Association. (2019). Ethics and human rights. Retrieved from <https://www.nursingworld.org/practice-policy/nursing-excellence/ethics/>
- Arizona Department of Health Services. (2016, April). Arizona primary care needs assessment. Retrieved from <https://www.azdhs.gov/documents/prevention/health-systems-development/data-reports-maps/reports/primary-care-needs-assessment.pdf>
- Arizona Sonora News Service. (2015, November 12). Despite benefits, rural communities struggle to attract medical professionals. Retrieved from <https://arizonasonoranewsservice.com/despite-benefits-rural-communities-struggle-attract-medical-professionals/>
- Blake, J., & Malone, L. (2014, March). Current behaviors, attitudes, and knowledge of nurse practitioners in primary care toward skin cancer screening/prevention. *Journal of Dermatology Nurses' Association*, 6(2), 65-69. doi: 10.1097/JDN.0000000000000031
- Bradley, H. B. (2012). Implementation of a skin cancer screening tool in a primary care setting: A pilot study. *Journal of the American Academy of Nurse Practitioners*, 24(2), 82-88. doi: 10.1111/j.1745-7599.2011.00669.x
- Chang, S. J., Choi, S., Kim, S. A., Song, M. (2014). Intervention strategies based on information-motivation-behavioral skills model for health behavior change: a systematic review. *Asian Nursing Research*, 8(3), 172-181. doi: 10.1016/j.anr.2014.08.002
- Chung, G. Y., Brown, G., & Gibson, D. (2015, April 4). Increasing melanoma screening among Hispanic/Latino Americans: A community-based educational intervention. *Health Education & Behavior*, 42(5), 627-632. doi: 10.1177/1090198115578748
- Chau, S., Chin, M., Chang, J., Luecha, A., Cheng, E., Schlesinger, J., . . . & Gelberg, L. (2002, May). Cancer risk behaviors and screening rates among homeless adults in Los Angeles County. *Cancer Epidemiology, Biomarkers & Prevention*, 11(5), 431-438. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/12010856>

- Clairwood, M., Ricketts, J., Grant-Kels, J., Gonsalves, L. (2014, April). Melanoma in skin of color in Connecticut: An analysis of melanoma incidence and stage at diagnosis in non-Hispanic blacks, non-Hispanic whites, and Hispanics. *International Journal of Dermatology*, 53(4), 425-433. doi: 10.1111/j.1365-4632.2012.05713.x
- Cormier, J. N., Xing, Y., Ding, M., Lee, J. E., Mansfield, P. F., Gershenwald, J. E., ..., & Du, X. L. (2006). Ethnic differences among patients with cutaneous melanoma. *Archives of Internal Medicine*, 166, 1907-1914. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/17000949>
- Coups, E. J., Stapleton, J. L., Hudson, S. V., Medina-Forrester, A., Rosenberg, S. A., Gordon, M., ... & Goydos, J. S. (2013). Skin cancer surveillance behaviors among US Hispanic adults. *American Academy of Dermatology*, 68(4), 1-9. doi: 10.1016/j.jaad.2012.09.032
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Science*, 35(8), 982-1003. doi:10.2307/249008
- DeKoninck, B., & Christenbery, T. (2015). Skin cancer screening in the medically underserved population: A unique opportunity for APNs to make a difference. *Journal of the American Association of Nurse Practitioners*, 27(9), 501-506. doi: 10.1002/2327-6924.12216
- Finkelman, A. (2018). *Quality improvement: A guide for integration in nursing*. Burlington, MA: Jones & Bartlett Learning.
- Fisher, J. D., & Fisher, W. A. (1992). Changing AIDS-risk behavior. *Psychological Bulletin*, 111(3), 455-474. <http://dx.doi.org/10.1037/0033-2909>
- Fisher, W. A., Fisher, J. D., & Harman, J. (2003). The information-motivation-behavioral skill model: A general social psychological approach to understanding promoting health behavior. In J. Suls & K. A. Wallston (Eds.), *Social psychological foundation of health and illness* (pp. 82-106). Malden, MA: Blackwell.
- Fisher, J. D., Fisher W. A., & Shuper, P. A. (2009). The information-motivation-behavioral skills model of HIV prevention behavior. In R. J. DiClemente, R. A. Crosby, & M. C. Kegler (Eds.), *Emerging Theories in health promotion practice and research* (pp. 21-63). San Francisco, CA: Jossey-Bass.
- Fleming, N. H., Grade, M. M., & Bendavid, E. (2018). Impact of primary care provider density on detection and diagnosis of cutaneous melanoma. *PLoS One*, 13(7), 1-11. doi: 10.1371/journal.pone.0200097
- Garnett, E., Townsend, J., Steele, B., & Watson, M. (2016, May). Characteristics, rates, and trends of melanoma incidence among Hispanics in the USA. *Cancer Causes & Control*, 27(5), 647-659. doi: 10.1007/s10552-016-0738-1

- Goodman, H., Pacheco, C. L., & Loescher, L. J. (2018). An online intervention to enhance nurse practitioners' skin cancer knowledge, attitudes, and counseling behaviors: A pilot study. *Journal of the Dermatology Nurses' Association*, *10*(1), 20–28. doi: 10.1097/JDN.0000000000000367
- Grange, F., Woronoff, A. S., Bera, R., Colomb, M., Lavole, B., Fournier, E., . . . & Barbe, C. (2014). Efficacy of a general practitioner training campaign for early detection of melanoma in France. *The British Journal of Dermatology*, *170*(1), 123-129. doi: 10.1111/bjd.12585
- Guy, G. P., Ekwueme, D. U., Tangka, F. K., & Richardson, L. C. (2012). Melanoma treatment costs: A systematic review of the literature. *American Journal of Preventative Medicine*, *43*(5), 537-545. doi: 10.1016/j.ampere.2012.07.031
- Harris, P. A., Taylor, R., Minor, B. L., Elliott, V., Fernandez, M., O'Neal, L., . . . Duda, S. N. (2019, July). The REDCap consortium: Building an international community of software platform partners. *Journal of Biomedical Informatics*, *95*, 1-10. doi: 10.1016/j.jbi.2019.103208
- Hartnett, P., & O'Keefe, C. (2016). Improving skin cancer knowledge among nurse practitioners. *Journal of the Dermatology Nurses' Association*, *8*(2), 123-128. doi: 10.1097/JDN.0000000000000206
- Harvey, V. M., Oldfield, C. W., Chen, J. T., & Eschbach, K. (2016). Melanoma disparities among US Hispanics: Use of the social ecological model to contextualize reasons for inequitable outcomes and frame a research agenda. *Journal of Skin Cancer*, *2016*, 1-9. doi: 1155/2016/4635740
- Harvey, V. M. (2018, April). Melanoma in US Hispanics: Recommended strategies to reduce health disparities. *Cutis*, *101*(4), 243-246. Retrieved from <https://www.mdedge.com/dermatology/article/162520/melanoma/melanoma-us-hispanics-recommended-strategies-reduce-disparities>
- Health Resources & Services Administration. (2016, October). Medically underserved areas and populations. Retrieved from <https://bhw.hrsa.gov/shortage-designation/nuap>
- Heavey, E. (2019). *Statistics for nursing: A practical approach* (3rd ed.). Burlington, MA: Jones & Bartlett Learning.
- Hu, S., Parmet, Y., Allen, G., Parker, D. F., Ma, F., Rouhani, P., & Kirsner, R. S. (2009). Disparity in melanoma: A trend analysis of incidence and stage at diagnosis among whites, Hispanics, and blacks in Florida. *Archives in Dermatology*, *145*(12), 1-6. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20026844>

- Hu, S., Sherman, R., Arheart, K., & Kirsner, R. S. (2014). Predictors of neighborhood risk for late-stage melanoma: Addressing disparities through spatial analysis and area-based measures. *The Journal of Investigative Dermatology*, *134*(4), 937-945. doi: 10.1038/jid.2013.465
- Imahiyerobo-Ip, J., Ip, I., Jamal, S., Nadiminti, U., & Sanchez, M. (2011, January). Skin cancer awareness in communities of color. *Journal of the American Academy of Dermatology*, *64*(11), 198-200. doi: 10.1016/j.jaad.2010.02.012
- Institute for Healthcare Improvement. (2017). QI essentials toolkit. Retrieved from <http://www.ihl.org/resources/Pages/Tools/default.aspx>
- Knapp, T.R. (2016, October). Why is the one-group pretest-posttest design still used? *Clinical Nursing Research*, *25*(5), 467-472. doi: 10.1177/1054773816666280
- Korta, D. Z., Saggar, V., Wu, T. P., & Sanchez, M. (2014, February). Racial differences in skin cancer awareness and surveillance practices at a public hospital dermatology clinic. *Journal of the American Academy of Dermatology*, *70*(2), 312-317. doi: 10.1016/j.jaad.2013.10.030
- Liang, J. C., Wu, S. H., Tsai, C. C. (2011, November). Nurses' internet self-efficacy and attitudes toward web-based continuing learning. *Nurse Education Today*, *31*(8), 768-773. doi: 10.1016/j.nedt.2010.11.021
- Loescher, L. J., Stratton, D., Slebodnik, M., & Goodman, H. (2018). A systematic review of nurse practitioners' skin cancer knowledge and attitudes, skin examination, and skin cancer detection and prevention education and training. *Journal of the American Association of Nurse Practitioners*, *30*, 43-58. doi: 10.1097/JXX.0000000000000004
- Markova, A., Weinstock, M. A., Risica, P., Kirtania, U., Shaikh, W., Ombao, H., . . . & Post, D. (2013, September). Effect of a web-based curriculum on primary care practice: Basic skin cancer triage trial. *Family Medicine*, *45*(8), 558-568. Retrieved from <https://fammedarchives.blob.core.windows.net/imagesandpdfs/pdfs/FamilyMedicineVol45Issue8Markova558.pdf>
- McMullen, C., Nielsen, M., Firemark, A., Price, P. M., Nakatani, D., Tuthill, J., . . . & Gilbert, S. (2018, December). Designing for impact: Identifying stakeholder-driven interventions to support recovery after major cancer surgery. *Supportive Care in Cancer*, *26*(12). doi: 10.1007/s00520-018-4276-0
- Miller, K. A., Langholz, B. M., Zadnick, J., Hamilton, A. S., Cozen, W., Mack, T. M., & Cockburn, M. G. (2015, August). Prevalence and predictors of recent skin examination in a population-based twin cohort. *Cancer Epidemiology, Biomarkers & Prevention*, *24*(8), 1190-1198. doi: 10.1158/1055-9965.EPI-14-1389

- Misovich, S. J., Martinez, T., Fisher, J. D., Bryan, A., & Catapano, N. (2003). Predicting breast self-examination: A test of the information-motivation-behavioral skills model. *Journal of Applied Social Psychology, 33*(4), 775-790. <http://dx.doi.org/10.1111/j.1559-1816.2003.tb01924.x>
- Moran, K., Burson, R., & Conrad, D. (2017). *The Doctor of Nursing Practice scholarly project* (2nd ed.). Burlington, MA: Jones & Bartlett Learning.
- Moser, A., & Korstjens, I. (2018). Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis. *The European Journal of General Practice, 24*(1), 9-18. doi: 10.1080/13814788.2017.1375091
- Pampena, R., Kyrgidis, A., Lallas, A., Moscarella, E., Argenziano, G., & Longo, C. (2017, November). A meta-analysis of nevus-associated melanoma: Prevalence and practical implications. *Journal of the American Academy of Dermatology, 77*(5), 938-945. doi: <https://doi.org/10.1016/j.jaad.2017.06.149>
- Perez, M. I. (2019, March). Skin cancer in Hispanics in the United States. *Journal of Drugs in Dermatology, 18*(3), 117-120. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/30909356>
- Polit, D. F. & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence of nurse practice*. Philadelphia, PA: Wolters Kluwer.
- Roebuck, H., Moran, K., MacDonald, D. A., Shumer, S., & McCune, R. L. (2015). Assessing skin cancer prevention and detection educational needs: An andragogical approach. *Journal for Nurse Practitioners, 11*, 409. Retrieved from <https://www-sciencedirect-com.ezproxy3.library.arizona.edu/science/article/pii/S1555415515001348>
- Sigh, S. D., Ajani, U. A., Johnson, C. J., Roland, K. B., Eide, M., Jemal, A., ... Ekwueme, D. U. (2011). Association of cutaneous melanoma incidence with area-based socioeconomic indicators-United States 2004-2006. *American Academy of Dermatology, 65*(5), 1-12. doi: 10.1016/j.jaad.2011.05.035
- Simons, L. P., Foerster, F., Bruck, P. A., Motiwalla, L. & Jonker, C. M., (2015). Microlearning mApp raises health competence: Hybrid service design. *Health and Technology, 5*(1), 35-43. doi: 10.1007/s12553-015-0095-1
- Stratton, D. B. (2019). The feasibility of using a theory-based, online delivery microlearning system to educate nurse practitioners about clinical skin examination for melanoma (Doctoral dissertation, University of Arizona, 2019).

- Tabor, J., Jennings, N., Kohler, L., Degnan, B., Derksen, D., Campos-Outcalt, D., & Eng, H. (2014, June). The supply of physician assistants, nurse practitioners, and certified nurse midwives in Arizona. Retrieved from <https://azahec.uahs.arizona.edu/sites/default/files/u9/azworkforcetrendanalysis02-06.pdf>
- United Community Health Center. (2019). Primary healthcare services at UCHC. Retrieved from <https://uchcaz.org/programs/primary-care/>
- U.S. Department of Health & Human Services (2019, January 11). Poverty guidelines. Retrieved from <https://aspe.hhs.gov/poverty-guidelines>
- United States Department of Labor. (2018, May). Nurse Practitioners. Retrieved from <https://www.bls.gov/oes/current/oes291171.htm>
- U.S. Preventive Services Task Force. (2016). Screening for skin cancer: US Preventive Services Task Force recommendation statement. *Journal of the American Medical Association*, 316(4), 429Y435. doi: 10.1001/jama.2016.8465
- Vimeo (2019). Vimeo can help. Retrieved from <https://vimeo.com>
- Walsh, J. L., & Petroll, A. E. (2017, June). Factors related to pre-exposure prophylaxis prescription by U.S. primary care physicians. *American Journal of Preventative Medicine*, 52(6), 165-172. doi: 10.1016/j.amepre.2017.01.025
- Wilde, M., Jones, B., Lewis, B. K., & Hull, C. M. (2013, January 15). Skin cancer screening in the homeless population. *Dermatology Online Journal*, 19(1), 14. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23374956>
- Woodmansee, R., Turnage, D., & Loerzel, V. (2018). Nurse practitioner student knowledge and attitudes toward skin cancer assessments. *Journal of the Dermatology Nurses' Association*, 10(2), 115-119. doi: 10.1097/JDN.0000000000000385
- Wu, X., Eide, M. J., King, J., Saraiya, M., Huang, Y., Wiggins, C., ... & Ekwueme, D. U. (2011). Racial and ethnic variations in incidence and survival of cutaneous melanoma in the United States, 1999-2006. *Journal of the American Academy of Dermatology*, 65(5), 25-37. doi: 10.1016/j.jaad.2011.05.034
- Zaccagnini, M.E., & White, K.W. (2017). *The Doctor of Nursing Practice essential: A model for advanced practice nursing* (3rd ed.). Burlington, MA: Jones & Bartlett Learning.
- Zarani, F., Besharat, M. A., Sadeeghian, S., & Sarami, G. (2010). The effectiveness of the information-motivation-behavioral skills model in promoting adherence in CABG patients. *Journal of Health Psychology*, 15(6), 828-837. <http://dx.doi.org/10.1177/1359105309357092>

Zhou, G., Zhang, L., Knoll, N., & Schwarzer, R. (2015). Facilitating sunscreen use among Chinese young adults: Less-motivated persons benefit from a planning intervention. *International Journal of Behavioral Medicine*, 22(4), 443–451.
<https://doi.org/10.1007/s12529-014-9458-7>