

A BRIEF EDUCATIONAL INTERVENTION TO ENHANCE NURSE
PRACTITIONERS' KNOWLEDGE, ATTITUDES AND SKIN CANCER
COUNSELING BEHAVIORS

by

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As members of the DNP Project Committee, we certify that we have read the DNP Project prepared by Hope Ann Goodman entitled A Brief Educational Intervention to Enhance Nurse Practitioners' Knowledge, Attitudes and Skin Cancer Counseling Behaviors and recommend that it be accepted as fulfilling the DNP Project requirement for the Degree of Doctor of Nursing Practice.

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Final approval and acceptance of this DNP Project is contingent upon the candidate's submission of the final copies of the DNP Project to the Graduate College.

I hereby certify that I have read this DNP Project prepared under my direction and recommend that it be accepted as fulfilling the DNP Project requirement.

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STATEMENT BY AUTHOR

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I would like to dedicate this project to my dad, Warren Francisco. He provided me with the support that I needed to make it into the Doctor of Nursing Practice Program. During times of discouragement throughout this program and project he was always there with words of encouragement. I would also like to dedicate this project to many other family members, including my husband Travis Goodman, that have offered me support, encouragement, and patience as I have completed this project.

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ABSTRACT

Background: Skin cancer is the most common form of cancer in the United States and is a public health concern. There are over 5 million new cases of keratinocyte skin cancer (KC) (previously known as non-melanoma skin cancer) and over 65,000 new cases of melanoma annually in the United States. Skin cancer is highly preventable, although prevention methods are not commonly practiced. Nurse practitioners have a key role in educating and encouraging patients to practice skin cancer prevention methods.

Purpose/Aims: The purpose of this project was to determine whether a brief educational video can improve nurse practitioner knowledge, attitudes, and behaviors regarding skin cancer and skin cancer prevention counseling.

Methods: A single subject pre-test post-test design guided this project. Participants completed an online pretest assessing skin cancer knowledge, attitudes, and behaviors. Following the pretest participants were given access to the video intervention. The intervention included information about skin cancer and published guidelines about skin cancer prevention counseling. Changes in knowledge, attitudes, and behaviors and satisfaction with the intervention were assessed through a post-test.

Results: A total of 30 eligible Arizona nurse practitioners completed both the pretest and posttest surveys. There was a statistically significant increase ($p=.000$) in knowledge from 64.17% on the pretest to 87.5% on the posttest. Attitudes about skin cancer and skin cancer counseling were fair on the pretest and significantly improved ($p=.000$) on the posttest. On the pretest, nurse practitioners had poor attitudes regarding skin cancer prevention counseling practice behaviors. These attitudes favorably increased ($p=.009$) on the posttest. Self-reported

practice behaviors also improved significantly following the intervention ($p=.000$). Participants' attitudes regarding the intervention were generally favorable.

Conclusions: A brief educational intervention offered online to nurse practitioners is highly effective for improving their knowledge, attitudes, and behaviors regarding skin cancer and skin cancer prevention counseling. The intervention is feasible to administer and is acceptable to nurse practitioners.

INTRODUCTION

This project sought to improve nurse practitioners' knowledge, attitudes, beliefs, and behaviors regarding counseling patients about skin cancer prevention. This section describes background on skin cancer and gaps in nurse practitioners' skin cancer counseling, the local problem, and the intended improvement of this project.

Background Knowledge

The three most common forms of skin cancer have similar risk factors. Basal cell carcinoma and squamous cell carcinoma are broadly categorized as keratinocyte skin cancer (KC) (also called non-melanoma skin cancer) (Wu, Han, Laden, & Qureshi, 2014). Melanoma is the most serious type of skin cancer. Primary risk factors for skin cancer are age and gender (older adult males), family history, and immunosuppression (for KC) (Rogers, Weinstock, Feldman, & Coldiron, 2015; Wu et al., 2014). The strongest environmental risk factor is ultraviolet radiation (UVR) exposure (Wu et al., 2014). Primary sources of UVR include the sun and tanning beds (Guy et al., 2015). UVR produces DNA damage, gene mutations, immunosuppression, oxidative stress and inflammatory responses. All of these cause photoaging of the skin and skin cancer (Moan, Grigalavicius, Baturaite, Dahlback, & Juzeniene, 2015).

Skin cancer has high incidence and associated morbidity and mortality. Skin cancer is the most common cancer in the United States. In 2012 there were an estimated 5,434,193 cases of KC treated in the United States (Rogers et al., 2015). Although death from KC is rare, risk of recurrence is high; individuals have a 44% chance of developing another basal cell carcinoma within three years following treatment for a previous KC (Marcil & Stern, 2000). Surgical scars can be disfiguring and lead to negative impacts on physical and emotional health. In 2011, there

were 65,647 reported cases of melanoma and 9,128 related deaths in the United States (Guy et al., 2015). Since 1982, rates of melanoma have doubled and are projected to continue increasing (Guy et al., 2015). If melanoma incidence continues the current trend, 2030 is estimated to have 112,000 new cases (Guy et al., 2015).

The cost burden of skin cancer is also high. In 2011, cost of melanoma treatment for all stages was estimated at \$3.3 billion (Guy et al., 2015). The estimated cost of treating and diagnosing new cases of melanoma will increase from \$457 million to \$1.6 billion in 2030 (Guy et al., 2015). There are an estimated \$46.3 million dollars in lost work days in the United States annually due to melanoma and KC combined (Guy & Ekwueme, 2011).

Despite the high burden of skin cancer, it is largely preventable-prevention includes adopting sun-protective behaviors, such as using sunscreen as directed, seeking shade, avoiding the sun during peak intensity, and wearing sun protective clothing, including a hat and sunglasses (Guy et al., 2015). Avoiding tanning beds and other forms of UVR nonsolar exposure also prevents skin cancer (Guy et al., 2015; Wu et al., 2014). Between 2020 and 2030, if skin cancer prevention methods are adopted widely across the nation, an estimated total 230,000 cases of melanoma will be prevented (Guy et al., 2015).

In 2014 the Surgeon General issued a call to action regarding skin cancer (U.S. Department of Health and Human Services, 2014). Within this call to action the Surgeon General enlisted healthcare providers in educating and counseling patients on methods to prevent skin cancer. However, the report also identified a need for provider education regarding skin cancer prevention counseling, defined as educating patients about sun avoidance including seeking shade, wearing a hat and sunglasses, wearing protective clothing, using sunscreen, avoiding the

sun during peak times, and avoiding tanning beds (U.S. Department of Health and Human Services, 2014).

This need for provider education on skin cancer counseling has been documented in other studies. In a study of 18.30 billion patient visits, Akamine, Gustafson, Davis, Levender, and Feldman (2014) found that in the United States from 1989 to 2010, patient education regarding sun safety was provided in only 0.03% and 0.01% of patient visits to a family or general practitioner and pediatric practitioner, respectively. Blake and Malone (2014) surveyed 64 nurse practitioners and found that 65% self-reported never or occasionally counseling patients about skin cancer prevention. Notably, 43% reported having a minimal knowledge of skin cancer and skin cancer prevention and 81% reported that they had not received training on skin cancer over the previous year (Blake and Malone, 2014). Roebuck, Moran, MacDonald, Shumer, and McCune (2015) surveyed 272 nurse practitioners and found that less than 20% reported always counseling patients about use of sunscreen, avoiding tanning beds, and identifying risk of skin cancer. Nurse practitioners in this sample requested that more education be provided regarding recommendations of skin cancer prevention counseling (Roebuck et al., 2015).

In summary, skin cancer has a high burden, but it can be prevented. Previous research demonstrates that nurse practitioners do not tend to counsel their patients about skin cancer prevention, even though provider counseling may improve patient behaviors and practice of skin cancer prevention procedures (U.S. Department of Health and Human Services, 2014). This project aimed to address the gap of educational interventions available for nurse practitioners to enhance skin cancer prevention counseling.

Local Problem

Skin cancer incidence is high in Arizona. Over a ten year span there were 100,266 reported cases of KC in the state of Arizona and the rates continue to rise (Harris, Griffith, & Moon, 2001). Of note, reports of KC are not required, and prevalence likely is underestimated. In 2011 there were 1,124 reported cases of melanoma in the state of Arizona (CDC, 2014). The rate of melanoma in Arizona is 16.5 per 100,000 compared to 19.9 per 100,000 in the United States (NCI, 2015). However, this number is likely underestimated owing to underreporting of melanoma incidence by dermatologists in Arizona (Harris et al., 2015). Harris et al. (2015) report that after 2012 melanoma reporting procedures were changed to capture more inclusive data resulting in an even higher incidence rate of melanoma.

There has not been a targeted focus in Arizona academic or continuing education venues to target nurse practitioners' skin cancer prevention counseling as part of promoting health and wellness. Nurse practitioners receive minimal education regarding skin cancer in their training program. There are also limited sources of continuing education regarding skin cancer for nurse practitioners. A recent survey of 39 Arizona nurse practitioners that care for adolescents indicated that overall knowledge of skin cancer was moderate to low (Lucas, 2014).

Lucas (2014) also found that although Arizona nurse practitioners felt skin cancer prevention was important, their counseling of patients was low. The majority of nurse practitioners in this sample never or occasionally counseled patients about sunscreen use. Arizona nurse practitioners reported knowing the guidelines regarding counseling patients about skin cancer prevention; however, their reported counseling behaviors were inconsistent with

these guidelines (Lucas, 2014). An assumption is that the gap in nurse practitioner practice that has been shown across the nation is present in the state of Arizona.

Intended Improvement

The purpose of this project was to describe current knowledge, attitudes, and behaviors and to determine whether a brief educational intervention targeted to nurse practitioners improved current knowledge, attitudes, and behaviors related to counseling patients about skin cancer and skin cancer prevention. The eight minute intervention was designed to provide nurse practitioners with information on current skin cancer prevention guidelines, help them overcome barriers to counseling, and enhance more favorable attitudes regarding counseling on skin cancer prevention. Nurse practitioners' self-reported sun safety counseling also was assessed to determine effect of the educational intervention. Finally, this project assessed the feasibility of using this intervention in practice.

Study Questions

1. What are Arizona nurse practitioners current knowledge, attitudes, and self-reported patient counseling behaviors regarding skin cancer?
2. In nurse practitioners in the primary care setting in Arizona, is an eight-minute educational video presentation on skin cancer prevention guidelines and counseling effective in improving nurse practitioner knowledge and attitudes regarding skin cancer counseling practices, and self-reported patient counseling behaviors?
3. Is the video presentation feasible to use in the primary care setting?

FRAMEWORK

Theoretical Framework

The model for improvement was the framework used to guide implementation of this project. Through a series of three questions this framework is helpful for determining a need for improvement and a subsequent plan to initiate improvement (IHI, 2016; Langley et al., 2009; U. S. Department of Health and Human Services, 2011). The questions specifically help identify the changes needed to reach the end goal, and what signifies reaching the end goal (Langley et al., 2009; U. S. Department of Health and Human Services, 2011). Based on responses to these questions, the proposed change and intervention are then tested through a Plan-Do-Study-Act (PDSA) cycle (IHI, 2016; Langley et al., 2009; U. S. Department of Health and Human Services, 2011). The purpose of the PDSA cycle is to conduct small-scale tests of the change or intervention, identifying barriers and areas for improvement for the intervention and then retesting (Langley et al., 2009; Taylor et al., 2014). This framework is appropriate when determining feasibility (Langley et al., 2009).

Regarding this project, taking the necessary steps made it possible to identify the effect of the intervention on knowledge, attitudes, and self-reported behaviors. This project was a small-scale test of the intervention to determine its effectiveness in closing the gap in nurse practitioner views of skin cancer prevention counseling and practice of such counseling. The steps of the model for improvement, as described above, were the foundation for this project (see Figure 1).

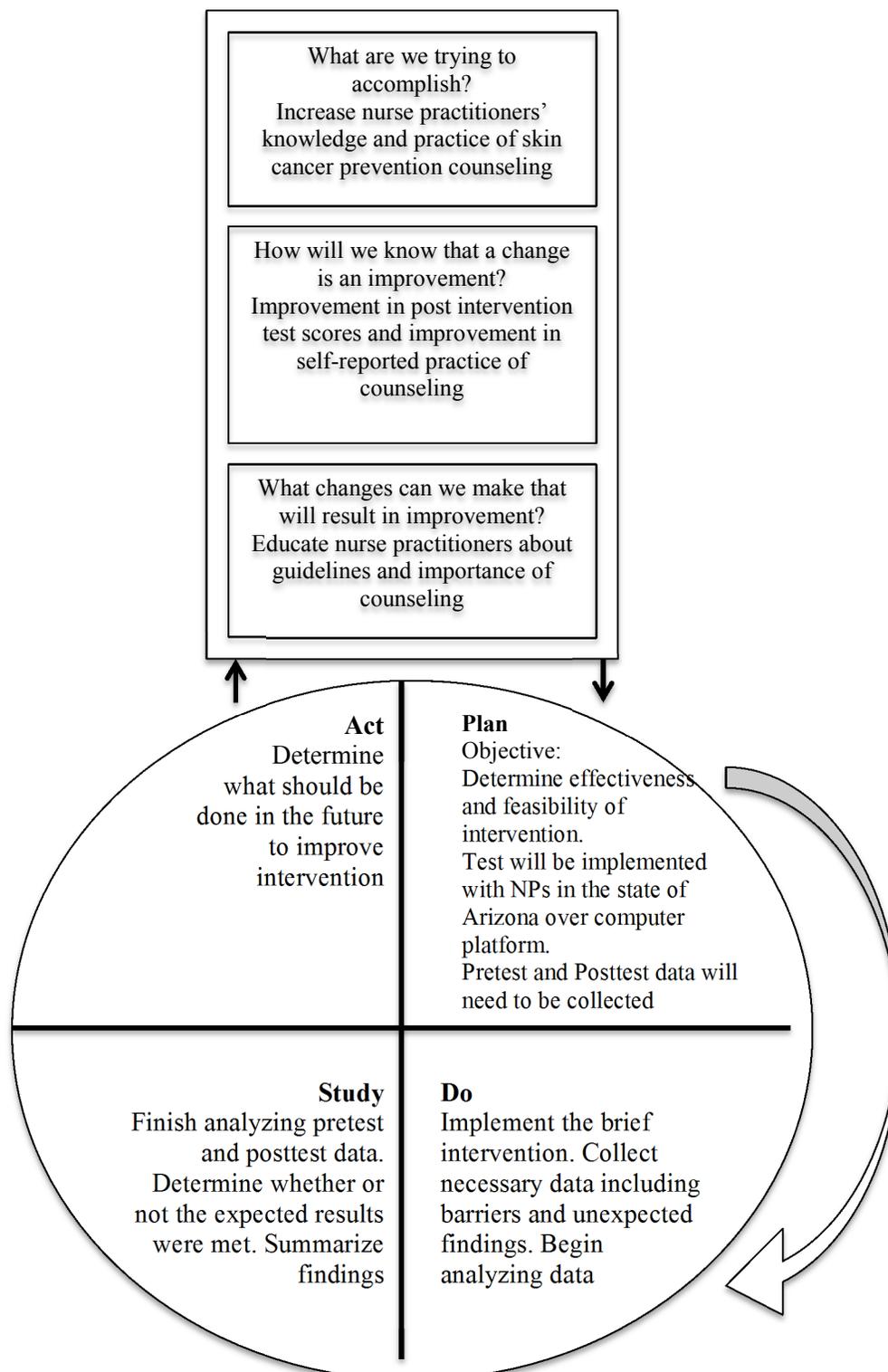


Figure 1. Application of the Model for Improvement in this DNP Project

Adapted from The Institute for Healthcare Improvement (2016). *Science of improvement: Testing change*. Retrieved on April 27th, 2016 from <http://www.ihl.org/resources/Pages/HowtoImprove/ScienceofImprovementTestingChanges.aspx>

Published guidelines regarding skin cancer prevention also served as a framework for the development of the brief educational PowerPoint presentation. These guidelines are those from the American Academy of Dermatology (AAD), the United States Preventive Services Task Force (USPSTF), and the American Academy of Family Physicians (AAFP) (see Table 1) (AAD, 2012; AAD, 2015; AAFP, 2016; USPSTF, 2015). The guidelines provided the foundation for knowledge items on the intervention pretest and posttest. Nurse practitioners are expected to implement practices that are supported by the evidence, so it was important to provide practice recommendations that are in line with the evidence and guidelines (AACN, 2006; AACN, 2011). Both master's and doctoral prepared nurse practitioners are expected to meet certain essentials (AACN, 2006; AACN, 2011). The essentials for both include an expectation of scholarship and evidence based practice (AACN, 2006; AACN 2011).

Other organizations were assessed for guidelines, however, these organizations did not offer any published guidelines for skin cancer prevention counseling. The American Academy of Nurse Practitioners (AANP) and American Cancer Society (ACS) do not offer specific guidelines or recommendations about counseling patients about skin cancer prevention. The National Cancer Institute (NCI) offers incomplete recommendations for counseling patients about skin cancer prevention. The NCI reports evidence in favor of practicing skin cancer prevention behaviors, but a lack of evidence for or against provider led patient counseling about skin cancer prevention (NCI, 2016). This conclusion is based on many studies that do not show the effects of patient counseling and skin cancer prevention on health outcomes (NCI, 2016).

Table 1. Skin Cancer Prevention Guidelines from Professional Organizations

Guideline	Recommendations
The American Academy of Dermatology (AAD, 2012; AAD, 2015)	<ul style="list-style-type: none"> • Counsel all populations about skin cancer prevention including children, adolescents, young adults, and adults to: <ul style="list-style-type: none"> • Avoid indoor tanning • Avoid ultraviolet radiation (UVR) <ul style="list-style-type: none"> • Apply sunscreen, even on cloudy days and every 2 hours when outside • Use a sunscreen with SPF of 30 that is broad spectrum • Seek shade • Wear long-sleeved shirt, pants, sunglasses, and a wide-brimmed hat • Practice sun protection consistently
United States Preventative Services Task Force (USPSTF, 2015)	<ul style="list-style-type: none"> • Counsel children, adolescents, and young adults between the ages of 10 and 24 with fair skin about reducing risk and preventing skin cancer through avoiding ultraviolet radiation • Does not support counseling adults older than 24 years
American Academy of Family Physicians (AAFP, 2016)	<ul style="list-style-type: none"> • Counsel persons with fair skin between the ages of 10-24 years about reducing exposure to UVR

Concepts

Skin cancer prevention, skin cancer prevention counseling behaviors, and skin cancer prevention knowledge and attitudes were the four main concepts of this DNP project. *Skin cancer prevention* was defined as practicing behaviors that reduce the risk of developing skin cancer (U.S. Department of Health and Human Services, 2014). One behavior is wearing protective clothing when outside--such as a wide-brimmed hat, sunglasses, and a tightly woven long sleeved shirt (UACC, 2016b). In Arizona, people should try to avoid the sun during peak times of 10am to 4pm, seek shade, and apply sunscreen to unprotected skin (UACC, 2016b).

Sunscreens should be broad spectrum (protect against UVA and UVB UVR) with an SPF of at least 30 in Arizona (UACC, 2016b). Sunscreens should state water resistant rather than water proof and must be reapplied every two hours or after swimming (U. S. Food and Drug Administration, 2015). These behaviors should be practiced consistently even on cloudy days. Skin cancer prevention behaviors also include avoiding tanning beds. Tanning beds are a manmade source of UVR (U.S. Department of Health and Human Services, 2014).

Skin cancer prevention counseling behavior was the second concept central to this DNP project. Skin cancer prevention counseling was defined as educating patients about implementing behaviors to prevent skin cancer, as listed above. Education may be provided through verbal communication during the primary care visit or through teaching aids such as educational pamphlets (Lin, Eder, & Weinmann, 2011; U.S. Department of Health and Human Services, 2014). The UACC provides brochures and educational tools that Arizona providers can use when counseling about skin cancer prevention (UACC, 2016a). Counseling may focus on educating patients about the importance of reducing risk of skin cancer in lieu of incidence and burden of skin cancer including effects on appearance (Lin et al., 2011; U.S. Department of Health and Human Services, 2014).

Final concepts included *knowledge* and *attitudes*. *Knowledge* was defined as the practitioner's ability to answer survey questions about skin cancer prevention and skin cancer prevention counseling guidelines appropriately (Lucas, 2014). *Attitudes* were defined as provider's personal feelings about aspects of skin cancer prevention and counseling (Lucas, 2014).

Literature Review

Search Strategy

The purpose of the literature search was to review articles pertaining to nurse practitioners' knowledge, attitudes, and skin cancer counseling behaviors. Another purpose of the literature review was to search for articles to provide support for the proposed video intervention and evidence for educating nurse practitioners to meet outcomes such as improving knowledge, attitudes, and behaviors.

Determining the current state of nurse practitioners' skin cancer knowledge, attitudes, and counseling behaviors required a search of the databases PubMed, CINAHL, and Google Scholar (see Table 2). Limitations set for all three databases included English, human subjects, and full text available. The publication date was expanded to include publication within the last ten years to maximize available evidence. Inclusion criteria included primary care healthcare providers, skin cancer prevention, knowledge, attitudes, or behaviors. Exclusion criteria included articles that focused on skin cancer that did not include information about provider prevention or counseling. PubMed was searched using the phrase "skin cancer prevention counseling" yielding 160 articles before limitations and one article led to a similar article that met inclusion criteria. The search phrase "skin cancer prevention" was used to search the CINAHL database yielding 262 articles before limitations were applied and two articles that met inclusion criteria. Google Scholar was searched using the search terms "nurse practitioner" AND "behaviors" AND "skin cancer." This search yielded 563 articles before limitations were applied and two articles met inclusion criteria. Additionally, one DNP project from the University of Arizona College of Nursing that focused on nurse practitioners and skin cancer counseling was included in the

review. The total number of articles yielded from these searches after limitations, exclusion, and inclusion criteria were applied was five.

To determine the support for the proposed video intervention and evidence for educating nurse practitioners to meet outcomes such as improving knowledge, attitudes, and behaviors the PubMed database and Google Scholar database were searched (see Table 3). Limitations set for all three databases included English, human subjects, and full text available. The publication date was expanded to include publication within the last ten years to maximize available evidence. Inclusion criteria included health care professionals and education of providers. PubMed was searched using the phrase “Internet-based learning in the health professions,” yielding 150 articles before limitations and two articles that met inclusion criteria. PubMed was also searched using the phrase “nurse practitioner skin cancer prevention,” yielding 27 articles before limitations were applied and one article that met inclusion criteria. Google Scholar was searched using the phrase “effectiveness of continuing medical education” yielding one article before limitations, which met inclusion criteria. Google scholar was also searched using the phrase “e-curriculum and health care providers,” yielding 1,040 articles before limitations and one article that had not been previously located which met inclusion criteria. Articles excluded did not include education of providers. The total number of articles included after limitations, exclusion and inclusion criteria were applied was six.

Synthesis of Evidence

The first part of the literature review focused on nurse practitioners’ skin cancer knowledge, attitudes, and counseling behaviors. The review of the literature found that nurse practitioner knowledge of skin cancer and skin cancer prevention is lacking (Blake & Malone,

2014; Furfaro, Bernaix, Schmidt, & Clement, 2008; Lucas, 2014; Roebuck et al., 2015).

Knowledge of skin cancer, skin cancer prevention, counseling, and guidelines ranged from 39.8% to 80% (Furfaro et al., 2008; Lucas, 2014). Between 19% and 22.4% reported receiving education about skin cancer in the previous year (Blake & Malone, 2014; Roebuck et al., 2015). About 84% requested more education about skin cancer (Roebuck et al., 2015). Only 17% of nurse practitioner participants self-reported having a substantial knowledge of skin cancer (Blake & Malone, 2014). The evidence shows a need for educating nurse practitioners.

The review also found that performance of skin cancer prevention counseling across primary care providers is low (Akamine et al., 2014). One study of patient visits to primary care providers across the US found that only 0.03% of general practice visits and 0.01% of pediatrician visits included counseling about skin cancer and skin cancer prevention (Akamine et al., 2014). When nurse practitioners were surveyed they most commonly reported never or occasionally counseling (Blake & Malone, 2014; Furfaro et al., 2008; Lucas, 2014; Roebuck et al., 2015). Between 45.6% and 65% of participants reported never or occasionally counseling (Blake & Malone, 2014; Roebuck et al., 2015). Nurse practitioners do not report counseling practices that are in line with current established guidelines (Lucas, 2014). These studies show a gap in current nurse practitioner practice of skin cancer counseling and provide a foundation for future research.

The literature indicated that nurse practitioners have mixed attitudes about skin cancer prevention and counseling (Lucas, 2014). According to one author, nurse practitioners reported feeling that skin cancer prevention counseling was not important to their practice (Lucas, 2014). Another author reported that 90% of nurse practitioners felt that counseling about prevention

could save lives (Blake & Malone, 2014). However, 73% of participants reported that counseling about skin cancer prevention was not a priority in their practice (Blake & Malone, 2014).

There are strengths and weaknesses to the articles reviewed. Strengths include the following: four of the five articles were based on a theoretical framework and four of the five studies were also focused on nurse practitioners, while one was focused on primary care providers. Weaknesses included small sample sizes ranging from 39 to 272, with one outlier study of big data that had a sample size of 18.30 billion. Weaknesses also included inconsistencies in study design, and the use of descriptive designs, which provide a lower level of evidence than randomized controlled trials.

In conclusion, the first part of the literature review shows a gap in current research and nurse practitioner skin cancer knowledge, attitudes and behaviors. Nurse practitioners commonly score low on knowledge tests regarding skin cancer (Blake & Malone, 2014; Furfaro et al., 2008; Lucas, 2014; Roebuck et al., 2015). Although nurse practitioners may report following established guidelines for skin cancer prevention and counseling, their reported practices are not in line with these guidelines (Lucas, 2014). The gap in nurse practitioner knowledge and behaviors has been an ongoing problem with limited published research about how to remedy this problem. This DNP project will help provide a foundation for future research for developing solutions to current gaps.

Table 2. Evidence of Nurse Practitioner Knowledge and Behaviors of Skin Cancer Prevention Counseling

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to skin cancer prevention counseling
Akamine, K. L., Gustafson, C. J., Davis, S. A., Levender, M. M., & Feldman, S. R. (2014)	Determine whether or not physicians are following guidelines for skin cancer prevention counseling and sunscreen counseling	Not reported	Retrospective	N= 18.30 billion patient visits Age: not reported Ethnicity: not reported	Query of the National Ambulatory Medical Care Survey database for data regarding which visits education about sunscreen and sun protection was provided in	12.83 million (0.07%) total visits included recommendations about sun protection Family/General Practitioners recommended sun protection at 0.03% of visits Pediatricians recommended sun protection at 0.01% of visits Conclusion: Practitioners are not following recommendations

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to skin cancer prevention counseling
						to educate patients about skin cancer prevention
Blake, J. L. & Malone, L. (2014)	Evaluate knowledge, attitudes and behaviors of primary care nurse practitioners about skin cancer prevention and screening	Social Cognitive Theory	Descriptive survey	N= 64 Nurse practitioners who graduated from Yale University and working in the primary care setting Age: not reported Ethnicity: not reported Years in practice: not	Survey tool adapted from Mikkilineni's survey targeted to PCP offices, originally developed in 2001	65% reported never or only sometimes counseling patients about skin cancer prevention 51% reported counseling only high risk patients 22% reported counseling only patients that brought up the topic of skin cancer prevention

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to skin cancer prevention counseling
				reported		<p>44% reported that patients want to be counseled about skin cancer prevention</p> <p>17% reported having a substantial knowledge of skin cancer and skin cancer prevention</p> <p>81% reported receiving no training over the last year about skin cancer prevention or screening</p> <p>Conclusion: Nurse practitioners are not counseling patients about</p>

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to skin cancer prevention counseling
						skin cancer prevention and are not receiving adequate education about the importance of such practices
Furfaro, T., Bernaix, L., Schmidt, C., & Clement, J. (2008)	Assess Illinois and California nurse practitioner knowledge and practices regarding malignant melanoma	PRECEDE-PROCEED Model	Descriptive survey	N=93 nurse practitioners certified in Illinois and California Age: average of 46, range 27-68 Ethnicity: primarily white Years in practice: average of 7 years	The Malignant Melanoma Prevention and Detection Survey adapted and name changed to The Nurse Practitioner Survey of Dermatological Assessment	Average knowledge score of 80% Respondents reported providing counseling about skin cancer prevention occasionally Conclusions: educating nurse practitioners about skin cancer prevention and counseling may improve practice

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to skin cancer prevention counseling behaviors
Lucas, M. A. (2014)	Evaluate knowledge, attitudes and practices of Arizona nurse practitioners working with adolescents in counseling patients on skin cancer prevention	Published guidelines and recommendations of skin cancer prevention of clinical practice guidelines	Descriptive cross-sectional	<p>N=39 nurse practitioners in the state of Arizona</p> <p>Age: average about 47 (SD 11.1), range 28-72</p> <p>Ethnicity: primarily white (85%)</p> <p>Years in practice: 49% had less than or equal to 5 years</p>	Survey using Qualtrics software distributed online	<p>Average scores for knowledge of skin cancer and prevention were 78%.</p> <p>39.8% correctly answered questions about clinical practice guidelines for adolescent counseling</p> <p>Participants did not categorize counseling about skin cancer as a priority</p>

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to skin cancer prevention counseling
						<p>32% reported not following a published guideline for skin cancer prevention counseling</p> <p>26% reported using a practice guideline, yet reported practices that were incongruent with the guidelines</p> <p>Conclusion: Nurse practitioners in Arizona do not have a sufficient knowledge of skin cancer and skin cancer prevention and are not counseling patients about prevention</p>

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to skin cancer prevention counseling
Roebuck, H., Moran, K., MacDonald, D. A., Shumer, S., & McCune, R. L. (2015)	Evaluate nurse practitioner educational needs and preferences regarding skin cancer	Theory of Andragogy Novice to Expert Theory	Descriptive, cross-sectional design	N=272 nurse practitioners of one professional state organization Age: average of 49.31 (SD 11.09), range 26-73 Ethnicity: 92.6% were white Years in practice: average of 9.22 years (SD 8.07)	Roebuck SCAN tool administered through Qualtrics survey software online, adapted from the Malignant Melanoma Prevention and Detection Survey	22.4% reported receiving education about skin cancer prevention and detection in the past year 84.2% reported an interest in education about melanoma and skin cancer 46.3% reported an interest in education that was provided through an online learning activity, compared to 20.2% interest in brochures or 18.8% in articles

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to skin cancer prevention counseling
						<p>45.6% reported occasionally or never counseling on sunscreen use with only 36.4% reporting frequently</p> <p>Conclusion: Nurse practitioners are not providing skin cancer prevention counseling and are being provided little to no education on the importance of practicing counseling</p>

The second part of the literature review focused on the support for the proposed video intervention and evidence for educating nurse practitioners to meet outcomes such as improving knowledge, attitudes, and behaviors. Several authors found that educating providers improves knowledge and practice behaviors (Bradley, 2010; Chen, Woyansky, & Zundell, 2015; Cook et al., 2008; Kemper, Gardiner, Gobble, Mitra, & Woods, 2006; Marinopoulos et al., 2007). The range in improvements in knowledge and practice behaviors ranged from 89% to 223.4% (Bradley, 2010; Kemper et al., 2006). Other authors concluded that education is generally effective in meeting and maintaining outcomes including knowledge, attitudes, and behaviors (Chen et al., 2015; Cook et al., 2008; Marinopoulos et al., 2007). These findings provide a foundation for the use of an educational intervention to improve nurse practitioner knowledge and practice behaviors of skin cancer prevention counseling.

This part of the literature review also found that educating providers through the use of an Internet based or an e-curriculum can be effective in improving knowledge and practice (Cook et al., 2008; Cook et al., 2010; Kemper et al., 2006). Internet based education delivered through different platforms including email or accessible on the web was effective in improving healthcare provider knowledge (Kemper et al., 2006). PowerPoint with voice over audio was found to be one of the well-received platforms of education (Cook et al., 2010). However, there were no specific data on the effectiveness or feasibility of the use of a brief PowerPoint. This DNP project will help to provide evidence regarding the effects and feasibility of using a brief PowerPoint converted into a video in educating nurse practitioners.

There are strengths and weaknesses for the articles in the second part of the literature review. Regarding strengths, four of the six studies had a design that produces a high level of

evidence, including a systematic review, meta-analysis, and randomized control trial. Two of the studies used a descriptive design. A weakness of the studies uncovered by the second part of the literature review was inconsistency in study design. Only one of six studies used a theoretical framework. Sample sizes were small in three of the studies ranging from 6 to 50; however, the other three studies reported strong sample sizes ranging from 145 to 780. Lastly, only two of the six articles were focused on nurse practitioners, while four were focused on healthcare professionals as a whole.

In conclusion, the second part of the literature review revealed that educating healthcare professionals including nurse practitioners, can improve practice behaviors and knowledge (Bradley, 2010; Chen et al., 2015; Cook et al., 2008; Kemper et al., 2006; Marinopoulos et al., 2007). Additionally, there is a gap in the research in educating nurse practitioners using Internet based platforms to improve skin cancer prevention and counseling knowledge and behaviors. This is of importance as nurse practitioners have expressed a strong interest in receiving education about skin cancer prevention and counseling over the Internet (Roebuck et al., 2015). Internet based education has been shown to be as effective as traditional methods (Cook et al., 2008; Cook et al., 2010; Kemper et al., 2006; Marinopoulos et al., 2007). The literature provides a foundation for future research and the development of an e-curriculum to close current gaps in research and nurse practitioner knowledge. The proposed project aims to fill these gaps.

Table 3. Literature Pertaining to Effects of Education in Improving Outcomes

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to effects of education, CME, and e-curriculum
Bradley, H. B. (2010)	Determine if education improves nurse practitioner knowledge of skin cancer screening, skills, and documentation	Health Promotion Model	Quasi-experimental	N= 6 nurse practitioners at a Northeastern United States college health center Age: range 40-64 Ethnicity: not reported Years in practice: not reported	Didactic skin cancer pretest and posttest Program evaluation questionnaire	223.4% improvement in the documentation of skin cancer screening and education Conclusion: Increase in correct answers from pretest to posttest, related to didactic education intervention

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to effects of education, CME, and e-curriculum
Chen, C., Woyansky, S., & Zundell, C. (2015)	Provide nurse practitioners with education about counseling patients about skin cancer prevention and determine if educational materials improve knowledge and practice behaviors	Not reported	Quasi-experimental	<p>N=30 pediatric and family nurse practitioner students at a New York City University</p> <p>Age: not reported</p> <p>Ethnicity: not reported</p> <p>Years in practice: 0, participants were nurse practitioner students</p>	<p>Skin cancer 101: Pre-test</p> <p>Skin cancer 101: Post-test</p>	<p>Pretest results revealed that 76% of respondents knew the correct answer to general skin cancer questions.</p> <p>Posttest questions were related to satisfaction of education, respondents reported an increase in confidence in educating patients about skin cancer prevention</p> <p>Conclusion: Educating nurse practitioners improves knowledge and</p>

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to effects of education, CME, and e-curriculum
						confidence in practice
Cook, D. A., Levinson, A. J., Garside, S., Dupras, D. M., Erwin, P. J., & Montori, V. M. (2008)	Compare the effectiveness of internet-based education with no education or non-internet based education in health professionals	Not reported	Meta-analysis	N=201 articles	Medline, Scopus, CINAHL, Embase, ERIC, TimeLit, Web of Science, Dissertation Abstracts, and University of Toronto Research and Development Resource Base were all assessed	<p>Internet based educational interventions have been shown to have an improved effect on health professionals' knowledge, practices, skills, etc.</p> <p>Conclusion: The analysis was inconclusive regarding evidence to show that internet based education was better or worse compared to non-internet based education on outcomes</p>

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to effects of education, CME, and e-curriculum
Cook, D. A., Levinson, A. J., Garside, S., Dupras, D. M., Erwin, P. J., & Montori, V. M. (2010)	Provide evidence of what types of internet-based learning are most effective for health professionals and how these formats may be improved	Not reported	Systematic review	N=50 articles	MEDLINE, CINAHL, EMBASE, ERIC, Scopus, TimeLit, Web of Science, and University of Toronto and Research and Development Resource Base were searched for applicable articles	<p>Internet based learning that includes PowerPoints with audio have higher satisfaction than those without audio voice over</p> <p>Conclusion: Internet based learning that includes practice exercises, repetition, and feedback were shown to be more effective in improving learning. Weak conclusion that audio voice over, repetition, practice exercises, and feedback may be considered</p>

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to effects of education, CME, and e-curriculum
						when developing internet based education programs for health professionals
Kemper, K. J., Gardiner, P., Gobble, J., Mitra, A., & Woods, C. (2006)	Compare effectiveness of four different platforms for internet based education delivery for healthcare professionals on outcomes including knowledge, confidence and communication	Not reported	Randomized control trial	N= 780 made up of physicians, pharmacists, nurses, and nutritionists Age: average 40.3 (SD 12.9) Ethnicity: primarily White (83%) Years in practice: not reported	A baseline and follow up survey were administered before and after intervention	Course completers had an improvement in knowledge scores from 67% on the baseline survey to 89% on the follow up survey with a value of $p < 0.001$ Conclusion: delivery method of the curriculum did not have a significant impact on completion of the education

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to effects of education, CME, and e-curriculum
						The option for continuing education credits had a higher impact on completion rates than delivery method
Marinopoulos, S. S., et al. (2007)	Determine effectiveness of continuing medical education in relation to delivery of education in terms of outcomes of knowledge, attitudes, skills, and behaviors	Not reported	Meta-Analysis	N=145 articles	Databases including MEDLINE, EMBASE, Cochrane Database, VENTRAL, DARE, PsycINFO, ERIC were searched for articles that met inclusion criteria	Continuing medical education was found to be generally effective in improving knowledge, attitudes, behaviors, and outcomes Live media was found to be more effective than print media

Reference	Purpose	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings pertaining to effects of education, CME, and e-curriculum
						<p>Conclusion: Multiple exposures to education improved outcomes, as did interactive education</p> <p>No other specific conclusions regarding continuing medical education could be drawn</p>

METHODS

Ethical considerations

The project was approved by the University of Arizona Institutional Review Board (IRB). The IRB ensured that the project met the ethical principles of respect for persons, justice, and beneficence. The IRB approved the project as exempt (see Appendix A).

Design

The design of this project was a single subject pre-test post-test. Each individual served as his or her control and the comparison, by comparing pre-test and post-test scores. This design was appropriate for this project as it measures knowledge scores before and after an intervention (Polit & Beck, 2012). Comparing these scores helped determine if the intervention elicited an effect on knowledge of the topic (Polit & Beck, 2012). This project included a brief educational video intervention on skin cancer and skin cancer prevention counseling and compared nurse practitioner knowledge, attitudes, and behaviors before and after the intervention.

Setting

The pretest, posttest, and intervention was administered online to nurse practitioners practicing in the state of Arizona; thus the setting was virtual. The primary investigator (PI) loaded the pre-test and post-test into Qualtrics. The survey was administered using Qualtrics software. Qualtrics is an online survey software that was developed to aid in the collection and analysis of data (Arizona Board of Regents, 2016). Qualtrics is available to University of Arizona students at no cost. Qualtrics can help organize data into tables for analysis after collection is complete (Arizona Board of Regents, 2016). Data in Qualtrics may be exported into SPSS or Excel software. Qualtrics also has security features that aid in protecting participant

information. Advantages of using an online platform for survey and intervention include ease of use and cost effectiveness (Bergeson, Gray, Ehrmantraut, Laibson, & Hays, 2013; Dykema, Jones, Piche, & Stevenson, 2013). Disadvantages of using online survey software included lower response rates (Bergeson et al., 2013; Cho, Johnson, & Vangeest, 2013).

Sample

The sample was composed of licensed nurse practitioners currently practicing in a primary care setting in the state of Arizona. To be included, nurse practitioners must have: 1) worked in the outpatient setting at least 17hrs/month or 200hrs/year and 2) had access to the Internet. Participants were not excluded from the study based on age, gender, race, years of time in practice, or practice population. Projected sample size was a minimum of 30 participants who completed both surveys and the intervention, and a maximum of 100 participants. This sample size is comparable to other published studies assessing knowledge, attitudes, and behaviors and implementing education of nurse practitioners regarding skin cancer prevention (Blake & Malone, 2014; Chen et al., 2015; Furfaro et al., 2008; Lucas, 2014). A sample size analysis revealed that for an expected mean increase of 1.33 and a standard deviation of 1.94, a sample of 34 was required (see Appendix B). In intervention studies an attrition rate of 12.5% from each phase of the study is not uncommon (Polit & Beck, 2012); therefore, to achieve a sample size of 30 completers required enrollment of 70 participants, and to achieve a sample size of 100 required 230 participants.

Sample Recruitment

Participants were recruited from listservs from professional nurse practitioner organizations including the Coalition of Arizona Nurses in Advanced Practice, the Northern Arizona Nurse Practitioner Group, and Southern Arizona Advanced Practice Nurse-Nurse Practitioner Society. To recruit nurse practitioners from these listservs, the PI asked the Webmaster to send an email invitation describing the project to the listserv, with the link to the survey on the email.

The PI attended the Arizona Nurse Practitioner Symposium in Scottsdale Arizona and recruited 40 nurse practitioners through obtaining personal emails. The PI emailed all of these individuals the descriptive letter of intent, invitation to participate in project, and link to pretest. The PI also distributed a letter of intent and link to the pretest to a) the listservs of the Northern Arizona Provider Group and Coalition of Arizona Nurses in Advanced Practice (CAZNAP) b) the homepage for members of the Southern Arizona Advanced Practice Nurse/Nurse Practitioner Society, c) to individual emails through the University of Arizona College of Nursing clinical faculty directory.

Finally, snowball sampling or network sampling was used where one nurse practitioner may tell another nurse practitioner about the project; the nurse practitioner may then request the surveys and intervention from the PI.

Intervention

The intervention link was emailed to participants after completion of the pre-test. Participants had four weeks to complete the intervention. The administered intervention was an eight-minute educational video presentation informing participants about skin cancer and current

published guidelines regarding skin cancer prevention counseling. The synthesis of the evidence supports the notion that an Internet-based education intervention is as effective as traditional in person methods (Cook et al., 2008; Cook et al., 2010; Kemper et al., 2006; Marinopoulos et al., 2007).

The objectives of the presentation were to provide nurse practitioners with: 1) key facts regarding skin cancer incidence and skin cancer prevention, 2) current published guidelines regarding counseling patients about skin cancer prevention, and 3) exemplars for practice of skin cancer prevention counseling congruent with guidelines. The video included information about skin cancer incidence in general and in Arizona. The video also included information about the cause of skin cancer and ways to prevent skin cancer and reduce risk of skin cancer. Lastly, main topics in the presentation included current guideline recommendations for skin cancer prevention and patient counseling, practice behaviors, and provider resources.

The video presentation was fourteen slides long and viewed in eight minutes. The presentation was set up so that participants had to start the presentation and then it played without further action from the viewer. The video presentation was accompanied by voice over audio by the PI, and engaging images and graphics to accommodate auditory and visual learning styles. The PI worked with an instructional designer at the University of Arizona College of Nursing office of Learning and Health Information Technology (LHTI) to develop an engaging and professional video with consistent audio. The PI emailed the video to participants after they completed of the pretest survey. The PI also worked with LHTI to link the pretest, intervention, and posttest and ensure continuity of surveys and video intervention.

Participants could access the intervention using their computer or smartphone. The PI checked compatibility of both approaches for smartphones on an iPhone and Android phone. Using the PowerPoint software required that the device used to access the intervention be compatible with PowerPoint. After consulting with LHTI, the PI chose to convert the PowerPoint to video format, which was then uploaded to Vimeo. Participants were then provided with a password to access the video on Vimeo. The PI pilot tested the video intervention with three nurse practitioners and with different devices to ensure all technical issues were addressed before launching the surveys and intervention.

Data Collection Tools

The pretest and posttest survey items and scales were adapted from a survey developed by Lucas (2014). The purpose of this 59 item survey was to assess skin cancer knowledge, attitudes and counseling behaviors of nurse practitioners caring for adolescents. The PI adapted items for nurse practitioners caring for both adolescent and adult patients. The World Health Organization (2016) defines adolescence as 10-19 years; thus the sample will include nurse practitioners caring for individuals from the age ranges of 10-99+. These survey items were applicable to this project's research questions.

The pretest survey was composed of five different sections, totaling 57 questions (see Appendix C). Section 1 consisted of three questions ensuring that potential participants meet inclusion criteria and were coded correctly. Section 2 consisted of eight multiple-choice items measuring nurse practitioner knowledge of skin cancer, skin cancer primary prevention, and practice guidelines. Total mean correct scores were calculated for this scale. Section 3 was composed of eight items measuring nurse practitioner attitudes regarding primary prevention

practices and 10 items on skin cancer practices attitudes, scored on two different Likert-type scales 1 ranging from 1 (never/ not at all) to 7 (all of the time/completely) and the other ranging from 1 (strongly disagree) to 7 (strongly agree). Previously these two scales had a Cronbach's alpha coefficient of 0.73 and 0.72, respectively (Lucas, 2014). Total mean scale scores were calculated for each set of items. Section 4 was composed of sixteen questions measuring frequency of nurse practitioner behaviors regarding skin cancer prevention and counseling, scored on Likert-type scales ranging from 1 (never) to 7 (always). Total mean scores were calculated for these scales. Previously these scales had Cronbach's alpha coefficients of 0.93, 0.97, and 0.97 respectively (Lucas, 2014). Section 5 was composed of 9 questions assessing demographics. The posttest was composed of 52 similar questions excluding Sections 1 and 5 and including a section scored on a Likert-type scale to measure participant satisfaction with the intervention (see Appendix D). The pretest and posttest surveys took 12 minutes to complete. The surveys were open from August 9th, 2016 to September 6th, 2016.

After completing the pretest the participants received an emailed link for the brief intervention. The posttest was then accessible from the intervention. After initial distribution the pretest link and letter of intent were distributed a second time to improve participant (Cho et al., 2013). The PI sent two to three reminder emails to pretest completers to view the intervention and complete the posttest.

Participants voluntarily completed the pretest, intervention, and posttest with the offer of being entered into a drawing for a \$50 gift card after completing all three phases of the project. Contact information in the form of an email address was obtained to send the participant the

intervention and posttest links. However, this information was not linked to pretest or posttest results.

Analysis

Descriptive statistics were used to analyze means and standard deviations of data. Comparisons of pretest and posttest data were also analyzed using a paired sample t test, which determined whether or not the intervention had an effect on test scores (Kellar & Kelvin, 2013). This statistical analysis is applicable when each individual in a group is their own control (Kellar & Kelvin, 2013).

Feasibility of the video intervention was assessed through data collected within Qualtrics. This included an analysis of the number of participants that started different phases of the project compared to the number that finished. Time stamps on pretest and posttest surveys were analyzed to determine the amount of time taken to complete.

RESULTS

Sample

Sixty-seven nurse practitioners who consented for the study opened the pretest. Four of these did not meet inclusion criteria and were excluded. One consented and opened the survey but did not complete the survey. One participant partially completed the pretest. Thus, 56 participants completed the pretest. Thirty-two participants completed the posttest; however, two of these did not complete the pretest and were eliminated from the project (see Figure 2). There were no statistically significant differences in demographic characteristics between pretest and posttest completers. Of the 30 pretest and posttest completers 29 (96.7%) were female (see Table 4). The majority of completers (96.7%) were white. The majority of participants reported a master's degree as their highest level of education (63.3%). The average age of project completers was 51.7 ± 10.76 , with a range of 27 to 66.

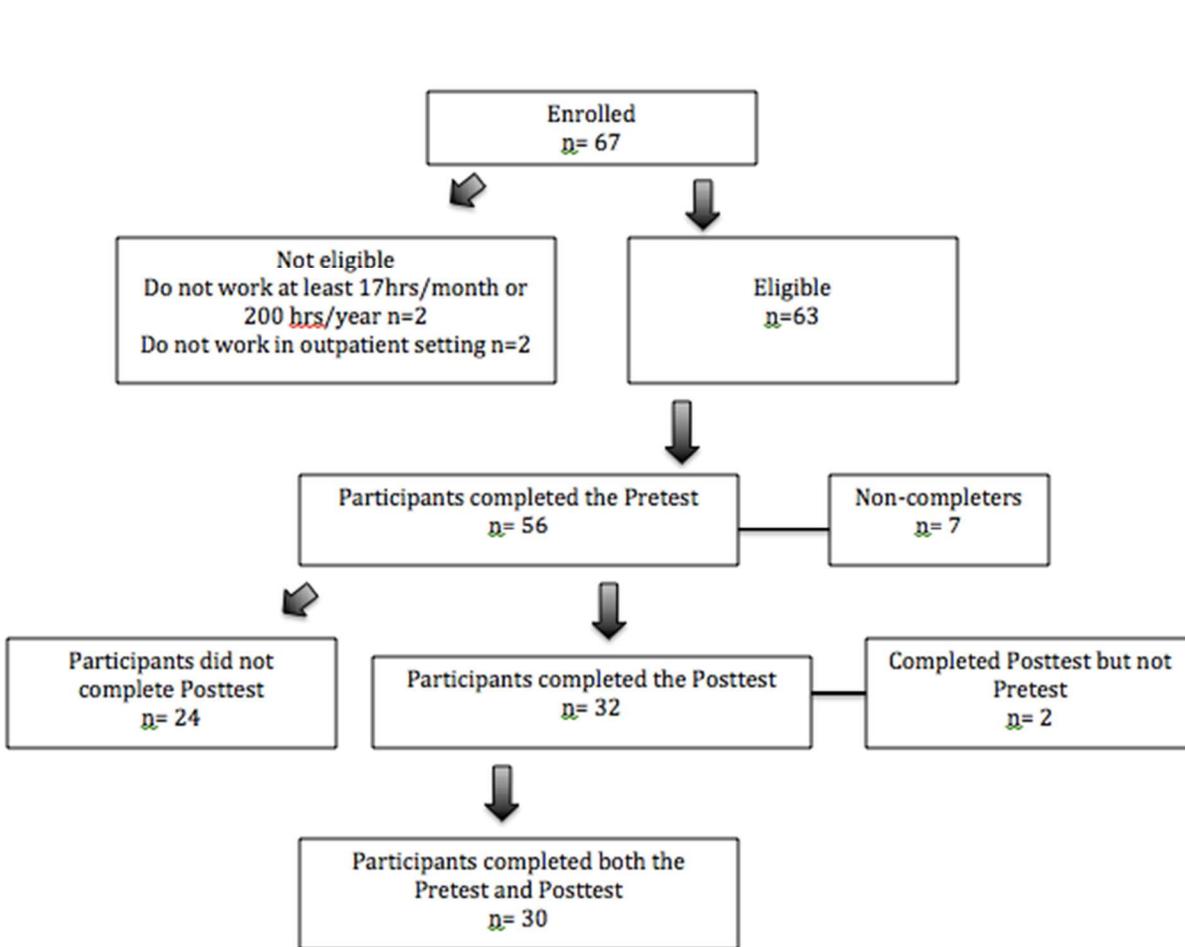


Figure 2. Flow of Participants Through the Project

Table 4. Sociodemographic Characteristics of Participants (n=30)

Sociodemographic Characteristic		Frequency	Percent
Gender	Female	29	96.7
	Male	1	3.3
Education	Bachelors degree	0	0
	Masters degree	19	63.3
	Doctor Nursing Practice (DNP)	7	23.3
	PhD	1	3.3
	DNP and PhD	2	6.7
	Other (NP certificate)	1	3.3
Ethnicity	Not Hispanic or Latino	28	93.3
	Hispanic or Latino	2	6.7
Race	Asian	1	3.3
	White	29	96.7
Age	Mean (SD)	51.70 (10.76)	
	Range	27-66	

Table 5 lists the practice characteristics. The majority of participants (63.3%) had family practice certification. Fifty three point three percent of nurse practitioners reported working in a family practice clinic. Twenty percent of participants reported working in another setting such as urology, urgent care, pediatrics, Obstetrics and Gynecology, and detention center, among others. Participants could select more than one option for work setting. The majority (26.7%) of participants had only been in practice for one to five years. More than half of participants reported that 50% or less of their visits were categorized as health promotion or wellness visits. The majority (23.3%) of participants reported 41%-50% of their visits were episodic. One-third of participants practiced in a rural setting, while the others practiced in an urban setting. On average, participants worked 124.76 hours a month.

Table 5. Practice Characteristics of Participants (n=30)

Practice Characteristics		Frequency	Percent
Certification Specialty	Family	19	63.3
	Adult	3	10.0
	Pediatrics	3	10.0
	Adult Gerontology	2	6.7
	Women's Health	2	6.7
	Other	1	3.3
Work Setting*	Family Practice	16	53.3
	Academic faculty/Adjunct faculty, Community Health, Emergency, Public Health, Rheumatology, Retail Health	6	20.0
	Other Dermatology	6 2	20.0 6.7
Years Practicing as a Nurse Practitioner	<1 year	2	6.7
	1-5 years	8	26.7
	6-10 years	6	20.0
	11-15 years	3	10.0
	16-20 years	6	20.0
	>20	5	16.7
Percentage of Patient Visits Related to Health Promotion, Wellness, etc.	<10%	5	16.7
	10-20%	4	13.3
	21-30%	2	6.7
	31-40%	4	13.3
	41-50%	1	3.3
	51-60%	5	16.7
	61-70%	5	16.7
	71-80%	1	3.3
	81-90%	1	3.3
91-100%	2	6.7	
Percentage of Patient Visits Related to Episodic Occurrences	<10%	3	10.0
	10-20%	3	10.0
	21-30%	6	20.0
	31-40%	4	13.3

Practice Characteristics		Frequency	Percent
	41-50%	7	23.3
	51-60%	1	3.3
	61-70%	1	3.3
	71-80%	3	10.0
	81-90%	0	0
	91-100%	2	6.7
Rural or Urban Practice Setting	Urban	20	66.7
	Rural	10	33.3
Average Hours per Month in Practice	Range	20-200	
	Mean (SD)	124.76 (55.78)	

*No responses were made for allergy/immunology, complementary, HIV/AIDS, infectious disease, nephrology, neurology, occupational health, orthopedics/sports medicine, pain management, palliative care, or school based clinic. Other options were described as OBGYN, detention center, home visits, pediatrics, and urology.

Nurse Practitioners' Knowledge of Skin Cancer Prevention and Guidelines

Ninety percent of participants knew the cause of skin cancer before viewing the intervention, while 100% of participants demonstrated understanding of the cause of skin cancer on the posttest (see Table 6). Participants' overall mean score correct on the pretest was 64.17% and increased to 87.5% on the posttest after viewing the brief intervention. When completing the pretest, only 3.3% of participants demonstrated an understanding of skin cancer prevention counseling guidelines from the AAFP and the USPSTF.

Table 6. Participants' Knowledge of Skin Cancer and Skin Cancer Primary Prevention (n=30)

Item	Frequency Pretest	Mean Score Correct (%) Pretest	Frequency Posttest	Mean Score Correct (%) Posttest
Main Cause of Skin Cancer	27	90.0	30	100.0
Most Protective Hat	25	83.3	26	86.7
Incidence of Skin Cancer	24	80.0	28	93.3
Sunscreen Application Timing	23	76.7	29	96.7
Most Protective Clothing	23	76.7	27	90.0
Guideline Knowledge				
American Academy of Dermatology	30	100	28	93.3
American Academy of Family Physicians	1	3.3	21	70.0
U.S. Preventive Services Task Force	1	3.3	21	70.0
Overall Mean Percentage Correct		64.17%		87.5%

Nurse Practitioners' Attitudes about Skin Cancer

Overall, participants initially demonstrated positive attitudes regarding skin cancer and risk of skin cancer specifically related to the Arizona patient population (see Table 7). After viewing the intervention participants' attitudes favorably increased. On the pretest participants were more likely to neither agree nor disagree that non-melanoma skin cancer is potentially a

fatal illness, on the posttest participants were more likely to view non-melanoma as a potentially fatal illness.

Table 7. Participants' Attitudes about Skin Cancer and Skin Cancer Risk (n=30)

Item	Likert Scale 1(never)- 7(all of the time)	Mean Score (SD) Pretest	Mean Score (SD) Posttest
In general, Arizona patients are at risk for developing non-melanoma skin cancer		6.63 (.556)	6.70 (.535)
Melanoma is potentially a fatal illness		6.53 (.730)	6.77 (.430)
Wearing clothing that protects from skin from the sun reduces the chances of getting skin cancer		6.23 (.728)	6.70 (.466)
In general, Arizona patients are at risk for developing melanoma		6.17 (1.315)	6.63 (.615)
Skin cancer is serious		6.03 (.964)	6.43 (1.073)
Using sunscreen as recommended reduces the chances of getting skin cancer		5.97 (1.273)	6.60 (.968)
Spending little time in the sun reduces the chances of getting skin cancer		5.47 (1.795)	6.57 (.858)
Non-melanoma skin cancer is potentially a fatal illness		4.63 (1.520)	5.43 (1.455)
Overall mean score		5.96 (.628)	6.48 (.552)
Cronbach's alpha		.720	.836

Nurse Practitioners' Practice Attitudes

Participants initially demonstrated some positive attitudes regarding counseling patients about skin cancer prevention (see Table 8). Before viewing the intervention participants were more likely to neither agree nor disagree or somewhat agree that skin cancer prevention was a priority in their practice. After viewing the intervention participants were more likely to somewhat agree to agree that skin cancer was a priority in their practice. Attitudes regarding counseling patients is within the scope of the nurse practitioner were unchanged from pretest to posttest.

Table 8. Participants' Attitudes about Skin Cancer Counseling (n=30)

Item	Likert Scale 1(strongly disagree)- 7(strongly agree)	Mean Score (SD) Pretest	Mean Score (SD) Posttest
Counseling patients about skin cancer prevention is within my scope of practice		6.87 (.346)	6.87 (.346)
Advice from nurse practitioners can help patients decrease their skin cancer risk		6.60 (.621)	6.57 (.568)
Counseling from a nurse practitioner will influence a patient's skin cancer risk-reducing behaviors		6.13 (.819)	6.00 (.983)
Counseling patients about skin cancer prevention is a good use of my time		5.97 (1.098)	6.13 (.819)
Skin cancer prevention for Arizona patients is something that concerns me		5.83 (1.117)	6.10 (.960)
I feel obligated to counsel my patients about skin cancer prevention		5.73 (1.337)	6.17 (.791)
Skin cancer prevention counseling is a priority in my practice		5.37 (1.326)	5.60 (1.221)
A patient's genetic factors (e.g. Personal or family history) affect my decision to provide skin cancer prevention counseling		5.33 (1.709)	5.87 (1.408)
Counseling patients about skin cancer prevention takes too much time		5.17 (1.18)	5.33 (1.58)
A patient's phenotypic factors (e.g. Numerous moles, fair skin) affect my decision to provide skin cancer prevention counseling		5.00 (1.619)	5.43 (1.612)
Overall mean score		5.80 (.612)	6.01 (.517)
Cronbach's alpha		.705	.702

Nurse Practitioners' Practice Behaviors

Participants who completed the pretest demonstrated somewhat favorable attitudes regarding counseling patients at general and high risk for skin cancer about skin cancer prevention (see Table 9). Most commonly, participants reported counseling patients about wearing sun protective clothing and using sunscreen with an SPF of 30 or higher. They did not commonly counsel about avoiding the sun and seeking shade. After viewing the intervention and completing the posttest attitudes regarding counseling about skin cancer prevention improved positively.

On average, on the pretest participants were less likely to assess patients' skin cancer prevention behaviors and counsel patients about skin cancer prevention (see Table 9). On the posttest, these attitudes increased positively. One key finding was that on the pretest, participants were unlikely to provide skin cancer prevention resource materials to patients. On the posttest participants reported that they likely would provide skin cancer prevention materials and resources.

Table 9. Participants' Skin Cancer Prevention Counseling Practice Behaviors (n=30)

Recommendation	Likert Scale 1- (extremely unlikely) 7- (extremely likely)	Mean Score (SD) Pretest	Mean Score (SD) Posttest
Messages to General Population			
Wear sun protective clothing (hats, long sleeves, etc.)		5.37 (1.474)	6.50 (.682)
Avoid sun exposure during the peak hours of 10 am to 2 pm		5.23 (1.832)	6.50 (.731)
Use SPF 30 or higher sunscreen		5.10 (1.807)	6.60 (.724)
Seek shade when outdoors during the day		5.07 (1.507)	6.40 (.770)
Messages to Increased Risk Population			
Wear sun protective clothing (hats, long sleeves, etc.)		5.90 (1.242)	6.87 (.346)
Use SPF 30 or higher sunscreen		5.50 (1.676)	6.87 (.434)
Seek shade when outdoors during the day		5.50 (1.526)	6.80 (.551)
Avoid sun exposure during the peak hours of 10 am to 2 pm		5.40 (1.754)	6.87 (.434)
Patient Counseling and Assessment			
Advise and counsel patients about skin cancer primary prevention		4.80 (1.730)	6.30 (.750)
Assess the patient's sunscreen use		4.13 (1.961)	5.93 (.980)
Assess the patient's use of other methods of sun protection (e.g., sun protective clothing, sun avoidance)		3.80 (2.007)	5.80 (1.186)
Follow an established practice guideline for skin cancer primary prevention counseling		3.70 (2.184)	6.20 (.925)
Assess the patient's ultraviolet radiation exposure		3.67 (1.953)	5.73 (1.202)
Assess the patient's barriers to sunscreen use		3.57 (2.046)	5.53 (1.252)
Provide skin cancer primary prevention resource materials		3.03 (1.921)	5.33 (1.605)
Overall mean score		4.65 (1.48)	6.28 (.589)
Cronbach's alpha		.967	.919

On the pretest, 33.3% of participants reported using the American Academy of Dermatology guidelines in practice whereas 76.7% reported using these guidelines on the

posttest (see Table 10). On the pretest, 23.3% of participants reported not using a published guideline regarding skin cancer prevention counseling in practice and on the posttest there were no reports of not using an established guideline.

Table 10. Choice of Established Skin Cancer Prevention Counseling Recommendation or Practice Guideline Used in Practice (n=30)

Guideline	Frequency Pretest	Percent (%) Pretest	Frequency Posttest	Percent (%) Posttest
American Academy of Dermatology	10	33.3%	23	76.7%
None	7	23.3%	0	0
U.S. Preventive Services Task Force	6	20.0%	2	6.7%
American Academy of Family Physicians	6	20.0%	5	16.7%
National Cancer Institute	1	3.3%	0	0

Effect of Intervention

The brief video intervention significantly changed scores from pretest to posttest for skin cancer knowledge, skin cancer attitudes, practice attitudes, and practice behaviors (see Table 11).

Table 11. Analysis and Paired Sample Statistics Pretest and Posttest (n=30)

Item	Mean (SD) Pretest	Mean (SD) Posttest	t score	Sig. (2-tailed)
Knowledge of Skin Cancer	64.16% (12.60)	87.5% (15.74)	-6.805	.000
Skin Cancer Attitudes	5.96 (.628)	6.48 (.552)	-6.625	.000
Practice Attitudes	5.80 (.613)	6.01 (.517)	-2.783	.009
Practice Behaviors	4.65 (1.48)	6.28 (.589)	-7.933	.000

Nurse Practitioners' Attitudes Regarding the Intervention

Participants demonstrated positive attitudes regarding the brief video intervention (see Table 12). Participants generally agreed that the information presented in the intervention was

useful to their practice. Participants agreed that the video was easily accessed and easily navigated. Participants also agreed that the audio component aided in the presentation.

On the pretest all but two participants completed the survey on the same day as beginning the survey, with a completion time ranging from 5 minutes to 19 minutes. On the posttest all participants completed the survey on the same day as beginning the survey, with a completion time ranging from 3 minutes to 40 minutes. Twenty of the 30 participants completed the pretest, intervention, and posttest all in the same day. Ten of the 30 participants completed the pretest and posttest with a gap ranging from 1 to 7 days between completions. One participant that completed the pretest, intervention, and posttest on the same day reported only watching portions of the intervention. All other 29 completers reported watching the full presentation.

Table 12. Participants' Attitudes Regarding the Brief PowerPoint Intervention (n= 30)

Item	Likert scale 1 (strongly disagree) - 7 (strongly agree)	Mean Score (SD)
Overall, information presented in the PowerPoint was useful to my practice		6.23 (.935)
The audio component added to the presentation		6.20 (1.349)
I could easily navigate the presentation		6.20 (1.606)
I could easily access the presentation link		6.17 (1.599)
I would recommend this presentation to colleagues		6.10 (1.348)
I had enough time to view the full presentation		6.07 (1.530)
I learned new information about skin cancer prevention		5.70 (1.685)
The length of the presentation was too long		5.66 (1.539)

DISCUSSION

This section of the DNP project will cover key findings in the context of the literature and study framework, The Model for Improvement and Clinical Practice Guidelines.

Effect of Intervention

Previous studies have shown that education can improve nurse practitioner skin cancer knowledge, attitudes, and behaviors (Bradley, 2010; Chen et al., 2015; Cook et al, 2008; Cook et al, 2010; Furfaro et al., 2008; Hartnett & O’Keefe, 2016; Kemper et al., 2006; Marinopoulos et al., 2007). This project demonstrated that an eight-minute video presentation on skin cancer prevention guidelines and counseling was highly effective in improving primary care nurse practitioners’ knowledge and attitudes regarding skin cancer counseling practices, and self-reported patient counseling behaviors. Only one other study has reported a similar approach using a brief skin cancer prevention-focused educational intervention (Hartnett & O’Keefe, 2016). These authors studied nurse practitioner knowledge of skin cancer prevention as well as skin cancer identification. They implemented a 15 minute educational intervention that although brief, was still longer than the intervention in the current project. Both interventions were similar in that they used a narrated slide presentation; however, that format was converted to video in the current study, facilitating ease of use. Hartnett & O’Keefe (2016) measured knowledge, perceptions, attitudes, and intention of skin cancer screening for future practice; however the current project quantified current self-reported practice behaviors. Both projects found that an online intervention led to a significant increase in nurse practitioner posttest scores measuring knowledge, perceptions and attitudes.

The current project strengthens support for the use of a brief video intervention for nurse practitioners. It had a larger sample size of 30 participants who completed the study, compared to the 10 completers in the Hartnett and O'Keefe (2016) study, thereby increasing representativeness of the findings. However, the findings of the current study are generalizable only to Arizona nurse practitioners. The current DNP project measured outcomes using a more comprehensive pretest and posttest with (57 items on the pretest and 53 on the posttest), whereas Hartnett and O'Keefe (2016) assessed attitudes for future practice using just one question on the posttest. Thus, the current project better discriminates specific attitudes and behaviors about skin cancer prevention and counseling. In line with Hartnett and O'Keefe (2016) this project found that a brief online narrated intervention can statistically significantly improve scores from pretest to posttest. Although historically nurse practitioners have been effectively educated about skin cancer through traditional didactic methods of teaching, this project and Hartnett and O'Keefe (2016) found that brief online interventions can be used effectively to improve nurse practitioner knowledge, attitudes, and skin cancer prevention counseling behaviors. However, it is not known if the effect of the brief educational video is sustainable. Future research should assess whether or not the changes seen on the posttest are still seen two to three months out from the initial assessment.

Nurse Practitioners' Knowledge of Skin Cancer Prevention and Guidelines

Multiple studies have shown that nurse practitioners have low knowledge scores regarding skin cancer prevention and skin cancer prevention guidelines (Blake & Malone, 2014; Furfaro et al., 2008; Lucas, 2014; Roebuck et al., 2015). Lucas (2014) found that Arizona nurse practitioners' knowledge of skin cancer prevention was low and that their knowledge of skin

cancer prevention guidelines was even lower. Blake and Malone (2014) and Furfaro, et al. (2008) found that nurse practitioners rarely counsel patients about skin cancer prevention. Blake and Malone (2014) also found that nurse practitioners self-reported having an insufficient knowledge of skin cancer and skin cancer prevention. In comparison with these previous studies, the current project also found that Arizona nurse practitioners have a limited knowledge of skin cancer prevention and skin cancer prevention guidelines.

The findings of this DNP project are similar to previous study findings of nurse practitioner skin cancer knowledge. Nurse practitioners decreased knowledge of skin cancer prevention and guidelines may be due to the lack of training received while in their nurse practitioner program as reported by Blake and Malone (2014), Lucas (2014), and Furfaro, et al. (2008). This lack of knowledge may also be attributed to the decreased availability and distribution of continuing education about skin cancer prevention and guidelines for nurse practitioners. The findings from the current study provide a foundation for educating nurse practitioners about skin cancer prevention and guidelines. Although nurse practitioners had suboptimal knowledge scores on the pretest in this project and in other studies, it is known that education can improve their knowledge (Bradley, 2010; Chen et al., 2015; Hartnett & O'Keefe, 2016).

On the pretest nurse practitioners showed low knowledge of when sunscreen should be applied before going outside and what type of clothing is the most protective. On the posttest, these two items demonstrated the largest increase for skin cancer prevention. Their initial low knowledge of sunscreen application time may be due to the common practice of applying sunscreen immediately before going outside. Their low knowledge of the most protective

clothing may be due to two similar answers on the pretest. The increase in knowledge may be attributed to the video intervention.

On the pretest 100% of nurse practitioners demonstrated understanding of the American Academy of Dermatology guidelines compared to only 93.3% on the posttest. This drop in percent correct may be due to the expanded knowledge of other guidelines that are similar but not the same. However, the questionnaire did not query participants about reasons underlying their knowledge of guidelines. Of note, on the pretest only one participant knew the recommended guidelines regarding skin cancer prevention recommended by the AAFP and the USPSTF. Twenty-one participants demonstrated knowledge of these guidelines on the posttest; however, knowledge of these guidelines was still suboptimal. This deficiency on the posttest may have been related to the preconceived assumption that all patients should be counseled, which is not recommended by these guidelines. These deficiencies may also have been a result of the participant not reading the full answer before selecting their answer and moving on. Participants may have also been affected by recall bias in choosing the answer that they previously chose on the pretest.

Overall, practitioners in the current project had a statistically significant increase in knowledge from the pretest to the posttest. This increase in knowledge can be attributed to the effect of the intervention. There is a slight possibility that after completing the pretest nurse practitioners may have looked up information they were unsure of before or after viewing the intervention. Participants may have also looked up answers while taking the posttest; however, this is unlikely as the average completion time for the post test was eight-minutes.

Nurse Practitioners' Attitudes about Skin Cancer and Practice Attitudes

Results from this DNP Project showed that nurse practitioners have generally positive attitudes regarding skin cancer and its incidence in Arizona. This finding was supported by Lucas (2014) who found that nurse practitioners have positive attitudes toward skin cancer prevention. Nurse practitioner attitudes about skin cancer may be generally favorable as skin cancer is common in Arizona. It is uncommon to live in Arizona and not know someone who has skin cancer.

Overall, participants' attitudes about skin cancer prevention counseling in practice favorably increased on the posttest. These included attitudes regarding the notion that using sunscreen as directed and reducing sun exposure can reduce the risk of skin cancer. Lucas (2014) found similar results. In the current project, these two attitudes had the largest increase from pretest to posttest, a finding that can be attributed to the educational intervention.

The current DNP project demonstrated that nurse practitioners generally agree that counseling patients is within their scope of practice and that nurse practitioner counseling can impact patient behaviors. Lucas (2014) and Blake and Malone (2014) had similar findings. Of note, participants in the current project did not change attitudes regarding scope of practice and skin cancer prevention counseling from the pretest to the posttest. This may be because nurse practitioners are educated about their scope of practice in school and have an understanding of what their scope of practice is before they viewed the video.

This project found that participants' attitudes were fair when it came to genotypic and phenotypic patient characteristics having an impact on their decision to counsel patients about skin cancer prevention. This attitude is important because the USPSTF and the AAFP guidelines

are based on phenotypic characteristics and risk factors. Lucas (2014) also found similar results regarding these nurse practitioner attitudes.

Nurse Practitioners' Practice Behaviors

Findings from this DNP project indicated that in general, participants had favorable behaviors about skin cancer prevention counseling. Previous research has shown that nurse practitioners have suboptimal behaviors regarding skin cancer prevention counseling (Blake & Malone, 2014; Furfaro et al., 2008; Lucas, 2014). Similar to other studies, the current project found that nurse practitioners inconsistently counsel patients in the general and high-risk populations about skin cancer prevention. Lucas (2014) found that nurse practitioners self report rarely using an established skin cancer prevention guideline. On the pretest for the current project, participants reported negative to neutral behaviors regarding skin cancer prevention counseling in practice. The two lowest self-reported behaviors on the pretest were following an established guideline and providing patients with skin cancer prevention resource materials. On the posttest participants reported improvement on guideline use. Although, participants self-reported rarely using an established guideline, the majority chose an established guideline that they would use; however, their knowledge of guidelines was poor. These findings reflect those of Lucas (2014), who found that nurse practitioner attitudes and behaviors were inconsistent with established guidelines. Similar to Lucas (2014), the current project found that nurse practitioners rarely provide educational materials to patients. Both of these behaviors had substantial improvement on the posttest, suggesting success of the intervention.

Nurse Practitioners' Attitudes Regarding the Intervention/Feasibility

Hartnett and O'Keefe (2016) found that online education is effective in educating nurse practitioners about skin cancer prevention. This DNP project found similar results. The intervention was well received by nurse practitioner participants. The current project found that the use of a brief online intervention was feasible for educating busy nurse practitioners. Like Hartnett and O'Keefe (2016) this project found that brief online educational interventions can be a solution to the lack of time that nurse practitioners have in the clinic setting. Overall, attitudes regarding the brief video intervention were positive. Of note, participants positively reported that the information in the video was important to their practice. Hartnett and O'Keefe (2016) also found that nurse practitioners reported information presented in an online educational intervention about skin cancer prevention to be important to their practice.

About 97% of participants viewed the full presentation. Interestingly, nurse practitioners reported that they somewhat agreed that they had learned new information from the educational intervention, despite the significant difference in their knowledge, attitudes, and behaviors from pretest to posttest. Hartnett and O'Keefe (2016) and Bradley (2012) found that nurse practitioners report satisfaction with education about skin cancer prevention and that online education is well received by nurse practitioners.

The intervention was reported to be easily accessed and navigated. Of significance to feasibility is that nurse practitioners reported having enough time to view the full presentation. Providing the intervention online also made it possible for participants in both rural and urban areas to access the intervention, with 33.3% of the sample practicing in a rural location. The intervention allowed nurse practitioners the time to educate themselves, as they were able to

access the intervention on their own time. The intervention was also brief maximizing the amount of time taken to complete the intervention.

Limitations

One limitation of this project was that the sample size was slightly underpowered. The sample size analysis found that a sample of 34 participants was required, thus the goal for the sample size was 34. This sample size was not met, with only 30 participants completing both the pretest and posttest. However, all findings were highly significant, indicating that the sample size was sufficient. The sample was also predominantly white females. Due to both of these limitations, the results of the project may not be generalizable to all primary care nurse practitioners in Arizona. There was also a high attrition rate with 67 individuals beginning the pretest and 30 that finished both the pretest and posttest. However, all participants who started the posttest, completed it. It is unknown whether all participants that actually viewed all or part of the video completed the posttest.

Implications for Clinical Practice

In agreement with previous research this project found that nurse practitioners are not following established guidelines, have poor knowledge of skin cancer, skin cancer prevention and guidelines, and are not counseling patients about skin cancer prevention. Skin cancer is the leading cancer in the United States. The Surgeon General has enlisted the help of health care providers including nurse practitioners, in the prevention of skin cancer (U.S. Department of Health and Human Services, 2014). Nurse practitioners play a key role in educating patients about skin cancer prevention. This project has shown that a brief educational, digital intervention can improve nurse practitioners' knowledge, attitudes, and behaviors and is feasible in practice.

In line with the framework used for this project the next steps are to implement the educational intervention on a larger scale basis and evaluate for continued effectiveness and generalizability. Outcomes should also be measured on a long-term basis. It would be important to know whether or not information is retained months after viewing the intervention.

The intervention is effective and may be distributed to nurse practitioners to improve knowledge of guidelines and clinical practice behaviors in line with skin cancer prevention guidelines. Distribution to nurse practitioners in practice may occur through email or online distribution through nurse practitioner listservs or online websites. This intervention may be specifically distributed to nurse practitioner organizations in Arizona, who might then forward on to current practicing nurse practitioners. The information within the intervention is mostly beneficial to primary care nurse practitioners, this should be made known when distributing the intervention. Thus, ensuring that the appropriate specialty has access to necessary education.

This intervention can also close the current gap in offering education to nurse practitioners located in rural areas. Nurse practitioners can also self-direct education through accessing the intervention on their own time. This intervention is ultimately important for practice as it can change nurse practitioner practice behaviors and aid in improving skin cancer prevention counseling possibly impacting skin cancer patient outcomes.

Conclusions

This DNP project found that although nurse practitioners are not currently counseling on skin cancer prevention and following recommended guidelines, an educational intervention can improve knowledge, attitudes, and practice behaviors regarding skin cancer prevention and patient counseling. This information will provide a foundation for future research regarding

educating nurse practitioners about skin cancer prevention guidelines on a larger scale and long-term basis. This information will also provide a foundation for current nurse practitioners seeking education and evidence regarding skin cancer prevention counseling in practice.

APPENDIX A
IRB APPROVAL



Research
Office for Research & Discovery

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 13, 2016
Principal Investigator: Hope Ann Francisco

Protocol Number: 1607705977
Protocol Title: A Brief Educational Intervention to Enhance Nurse Practitioners' Knowledge, Attitudes and Skin Cancer Counseling Behaviors

Level of Review: Exempt
Determination: Approved

Documents Reviewed Concurrently:

Data Collection Tools: *Posttest.docx*
Data Collection Tools: *PreTest.docx*
Grant/Contracts: *Francisco_Hope_F200_Application.doc*
HSPP Forms/Correspondence: *f107_verification_of_human_subjects_training_form.doc*
HSPP Forms/Correspondence: *Francisco_Hope_Appendix_F.docx*
HSPP Forms/Correspondence: *Signature page 7-7-16.pdf*
Informed Consent/PHI Forms: *Francisco_PreTest_DisclosureStatement.doc*
Informed Consent/PHI Forms: *Francisco_PreTest_DisclosureStatement.pdf*
Other Approvals and Authorizations: *16 June 15_25568_francisco_exempt src outcome report.pdf*
Other Approvals and Authorizations: *Approval for NAPG listserv.pdf*
Participant Material: *PrimarySkinCancerPreventionStoryBoard.pdf*
Recruitment Material: *Letter of Intent.docx*

This submission meets the criteria for exemption under 45 CFR 46.101(b). This project has been reviewed and approved by an IRB Chair or designee.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB.
- Exempt projects do not have a continuing review requirement.
- Amendments to exempt projects that change the nature of the project should be submitted to the Human Subjects Protection Program (HSPP) for a new determination. See the Guidance on Exempt Research information on changes that affect the determination of exemption. Please contact the HSPP to consult on whether the proposed changes need further review.
- You should report any unanticipated problems involving risks to the participants or others to the IRB.

- All documents referenced in this submission have been reviewed and approved. Documents are filed with the HSPP Office. If subjects will be consented, the approved consent(s) are attached to the approval notification from the HSPP Office.

APPENDIX B
SAMPLE SIZE ANALYSIS

Appendix B

Sample Size Analysis

Inference for Means: Comparing Two Independent Samples

(To use this page, your browser must recognize JavaScript.)

Choose which calculation you desire, enter the relevant population values for μ_1 (mean of population 1), μ_2 (mean of population 2), and σ (common standard deviation) and, if calculating power, a sample size (assumed the same for each sample). You may also modify α (type I error rate) and the power, if relevant. After making your entries, hit the calculate button at the bottom.

- Calculate Sample Size (for specified Power)
- Calculate Power (for specified Sample Size)

Enter a value for μ_1 :

Enter a value for μ_2 :

Enter a value for σ :

- 1 Sided Test
- 2 Sided Test

Enter a value for α (default is .05):

Enter a value for desired power (default is .80):

The sample size (for each sample separately) is:

Reference: The calculations are the customary ones based on normal distributions. See for example *Hypothesis Testing: Two-Sample Inference - Estimation of Sample Size and Power for Comparing Two Means* in Bernard Rosner's **Fundamentals of Biostatistics**.

Rollin Brant
Email me at: rollin@stat.ubc.ca

Brant, R. (n.d.). *Inference for means: Comparing two independent samples*. Retrieved on May

17th, 2016 from <http://www.stat.ubc.ca/~rollin/stats/ssize/n2.html>

APPENDIX C
PRETEST SURVEY OF NURSE PRACTITIONER KNOWLEDGE ATTITUDES AND
BEHAVIORS

Appendix C

Pretest Survey of Nurse Practitioner Knowledge Attitudes and Behaviors

Section 1 (Inclusion criteria)

1) Are you currently working at least an average of 17hrs/month or 200hrs/year as a nurse practitioner in a clinical setting treating patients in Arizona?

Yes

No [Thanks for your interest, but you are not eligible to proceed through the survey]

2) What is your current practice setting?

Inpatient [Thanks for your interest, but you are not eligible to proceed through the survey]

Outpatient

3) What are the last 4 numbers of your cell phone number?

Section 2 (Knowledge of Skin Cancer, Skin Cancer Primary Prevention, and Practice Guidelines)

Please select the correct answer:

4) The incidence of skin cancer in Arizona is:

- a) Declining
- b) Staying the same
- c) Increasing*
- d) Don't know/Unsure

5) In general, the main cause of most skin cancer is:

- a) Chemical exposure
- b) Ultraviolet radiation*
- c) Ionizing radiation
- d) Don't know/Unsure

6) What type of clothing material is most protective while in the sun?

- a) Loosely fitting and tightly woven*
- b) Tightly fitting and tightly woven
- c) Loosely fitting and loosely woven
- d) Don't know/Unsure

- 7) How long before going out in the sun should one apply sunscreen for it to be most effective?
- a) 15-30 minutes*
 - b) Just before going out in the sun
 - c) 5-10 minutes
 - d) Don't know/Unsure
- 8) Which of the following types of hats provides the best protection from the sun?
- a) Wide-brimmed straw hat?
 - b) Baseball cap
 - c) Tightly-woven wide-brimmed cloth hat*
 - d) Don't know/Unsure
- 9) According to the American Academy of Dermatology clinical guidelines, the following patients should be counseled regarding skin cancer:
- a) Every patient*
 - b) Only those with light skin
 - c) Only those with a history of skin cancer
 - d) Don't know/Unsure
- 10) According to the American Academy of Family Physicians, the following patients should be counseled regarding skin cancer:
- a) Every patient
 - b) Only those with light skin between the ages of 10-24*
 - c) Only those with a history of skin cancer
 - d) Don't know/Unsure
- 11) According to USPSTF guidelines, the following patients should be counseled regarding skin cancer:
- a) Every patient
 - b) Only those with light skin between the ages of 10-24*
 - c) Only those with a history of skin cancer
 - d) Don't know/Unsure

Section 3 (Skin Cancer Attitudes)

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

Items are scored on Likert-type scales with response options ranging from 1(low anchor) to 7 (high anchor)

1 2 3 4 5 6 7

In your opinion,

- 12) Skin cancer is serious
1=never, 7= all of the time
- 13) Cutaneous melanoma is potentially a fatal illness
1=never, 7= all of the time
- 14) Non-melanoma skin cancer is potentially a fatal illness
1=never, 7=all of the time
- 15) Using sunscreen as recommended reduces the chances of getting skin cancer
1=not at all, 7= completely
- 16) Spending little time in the sun reduces the chances of getting skin cancer
1=not at all, 7= completely
- 17) Wearing clothing that protects skin from the sun reduces the chances of getting skin cancer
1=not at all, 7= completely
- 18) Patients in Arizona, in general, are at risk for developing melanoma
1=not at all, 7= completely
- 19) Patients in Arizona, in general, are at risk for developing non-melanoma skin cancer

Practice Attitudes

Items are scored on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree)

1 2 3 4 5 6 7

- 20) Skin cancer prevention counseling is a priority in my practice
- 21) Skin cancer prevention for Arizona patients is something that concerns me
- 22) Counseling patients about skin cancer prevention takes too much time
- 23) Counseling patients about skin cancer prevention is a good use of my time
- 24) Counseling patients about skin cancer prevention is within my scope of practice
- 25) I feel obligated to counsel my patients about skin cancer prevention
- 26) Advice from nurse practitioners can help patients decrease their skin cancer risk
- 27) Counseling from a nurse practitioner will influence a patient's skin cancer risk-reducing behaviors.
- 28) A patient's phenotypic factors (e.g. numerous moles, fair skin) affect my decision to provide skin cancer prevention counseling

- 29) A patient's genetic factors (e.g. personal or family history) affect my decision to provide skin cancer prevention counseling.

Section 4 (Practice Behaviors)

Items below are scored on a 7-point Likert-type scale ranging from 1 (Extremely unlikely) to 7 (Extremely likely)

1 2 3 4 5 6 7

How often do you recommend the following behaviors to your patients in the general population (i.e., not at increased risk of skin cancer):

- 30) Use SPF 30 or higher sunscreen
- 31) Avoid sun exposure during the peak hours of 10 am to 2 pm
- 32) Wear sun protective clothing (hats, long sleeves, etc.)
- 33) Seek shade when outdoors during the day

How often do you recommend the following behaviors to your patients at an increased risk of skin cancer:

- 34) Use SPF 30 or higher sunscreen
- 35) Avoid sun exposure during the peak hours of 10 am to 2 pm
- 36) Wear sun protective clothing (hats, long sleeves, etc.)
- 37) Seek shade when outdoors during the day

How often do you do the following activities for your patients:

Items are scored on a 7-point Likert-type scale ranging from 1 (Never) to 7 (Always)

1 2 3 4 5 6 7

- 38) Assess the patient's ultraviolet radiation exposure
- 39) Assess the patient's sunscreen use
- 40) Assess the patient's barriers to sunscreen use
- 41) Assess the patient's use of other methods of sun protection (e.g., sun protective clothing, sun avoidance)
- 42) Provide skin cancer primary prevention resource materials
- 43) Advise and counsel patients about skin cancer primary prevention
- 44) Follow an established practice guideline for skin cancer primary prevention counseling
- 45) Choose the established skin cancer prevention counseling recommendation or practice guideline that you prefer to use in practice:
 - American Academy of Dermatology
 - National Cancer Institute

United States Preventive Service Task Force
American Academy of Family Physicians
Other (specify):
None

Section 5 (Demographics)

46) Identify your main population focus (certification specialty). Mark all that apply

Adult

Adult-Gerontology

Family

Pediatrics

Women's Health

Other (specify):

47) In what type of setting do you work as a nurse practitioner? Check all that apply

Academic faculty/Adjunct faculty

Allergy/Immunology

Cardiovascular

Community Health

Complementary

Dermatology

Emergency

Endocrinology

Family Practice

Gastroenterology

HIV/AIDS

Infectious Disease
Nephrology
Neurology
Occupation Health
Oncology
Orthopedics/Sports Medicine
Pain Management
Palliative
Pulmonology/Respiratory
Retail Health
Rheumatology
School Based Clinic (Elementary-HS)
Surgical
University/College Student Health
Wound Care
Other (Specify)

48) How many years have you been a practicing nurse practitioner?

< 1 year

1-5 years

6-10 years

11-15 years

16-20 years

>20 years

49) On average, how many hours a month are you in practice?
_____ hours

50) In your practice what is the approximate percentage of patient visits that are preventive or related to health promotion, wellness, etc. Select one response.

<10%

10-20%

21-30%

31-40%

41-50%

51-60%

61-70%

71-80%

81-90%

91-100%

51) In your practice, on average, what percentage of patient visits are episodic (same day, sick, etc.). Select one response.

<10%

10-20%

21-30%

31-40%

41-50%

51-60%

61-70%

71-80%

81-90%

91-100%

52) What is your age? ____ years old

53) What is your gender?

Male

Female

Other

54) What is the highest level of schooling you have completed? (Select one)

Bachelors Degree

Masters Degree

DNP Degree

PhD Degree

DNP and PhD (dual) Degree

Other (specify):

55) Which choice best describes your ethnic background? (Choose One)

Hispanic or Latino

Not Hispanic or Latino

56) Which choice best describes your racial background? (Choose One)

American Indian/Alaskan Native

Asian

Native Hawaiian or Other Pacific Islander

Black or African American

White

57) What is the zip code of your practice location?

APPENDIX D
POSTTEST SURVEY OF NURSE PRACTITIONER KNOWLEDGE ATTITUDES AND
BEHAVIORS

Appendix D

Posttest Survey of Nurse Practitioner Knowledge Attitudes and Behaviors

Section 1 (Coding criteria)

- 1) What are the last 4 numbers of your cell phone number?
- 2) I viewed the brief skin cancer prevention presentation:
 - a) From beginning to end
 - b) Parts of it
 - c) Did not view the video

Section 2 (Knowledge of Skin Cancer, Skin Cancer Primary Prevention, and Practice Guidelines)

Please select the correct answer:

- 3) The incidence of skin cancer in Arizona is:
 - a) Declining
 - b) Staying the same
 - c) Increasing*
 - d) Don't know/Unsure
- 4) In general, the main cause of most skin cancer is:
 - a) Chemical exposure
 - b) Ultraviolet radiation*
 - c) Ionizing radiation
 - d) Don't know/Unsure
- 5) What type of clothing material is most protective while in the sun?
 - a) Loosely fitting and tightly woven*
 - b) Tightly fitting and tightly woven
 - c) Loosely fitting and loosely woven
 - d) Don't know/Unsure
- 6) How long before going out in the sun should one apply sunscreen for it to be most effective?
 - a) 15-30 minutes*
 - b) Just before going out in the sun
 - c) 5-10 minutes
 - d) Don't know/Unsure
- 7) Which of the following types of hats provides the best protection from the sun?
 - a) Wide-brimmed straw hat

- b) Baseball cap
 - c) Tightly-woven wide-brimmed cloth hat*
 - d) Don't know/Unsure
- 8) According to the American Academy of Dermatology clinical guidelines, the following patients should be counseled regarding skin cancer:
- a) Every patient*
 - b) Only those with light skin
 - c) Only those with a history of skin cancer
 - d) Don't know/Unsure
- 9) According to the American Academy of Family Physicians, the following patients should be counseled regarding skin cancer:
- a) Every patient
 - b) Only those with light skin between the ages of 10-24*
 - c) Only those with a history of skin cancer
 - d) Don't know/Unsure
- 10) According to USPSTF guidelines, the following patients should be counseled regarding skin cancer:
- a) Every patient
 - b) Only those with light skin between the ages of 10-24*
 - c) Only those with a history of skin cancer
 - d) Don't know/Unsure

Section 3 (Skin Cancer Attitudes)

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

Items are scored on Likert-type scales with response options ranging from 1(low anchor) to 7 (high anchor)

1 2 3 4 5 6 7

In your opinion,

11) Skin cancer is serious

1=never, 7= all of the time

12) Cutaneous melanoma is potentially a fatal illness

1=never, 7= all of the time

- 13) Non-melanoma skin cancer is potentially a fatal illness
1=never, 7=all of the time
- 14) Using sunscreen as recommended reduces the chances of getting skin cancer
1=not at all, 7= completely
- 15) Spending little time in the sun reduces the chances of getting skin cancer
1=not at all, 7= completely
- 16) Wearing clothing that protects skin from the sun reduces the chances of getting skin cancer
1=not at all, 7= completely
- 17) Patients in Arizona, in general, are at risk for developing melanoma
1=not at all, 7= completely
- 18) Patients in Arizona, in general, are at risk for developing non-melanoma skin cancer
1=not at all, 7= completely

Practice Attitudes

Items are scored on a 7 point Likert-type scale ranging from 1 (Extremely unlikely) to 7 (Extremely likely)

1 2 3 4 5 6 7

- 19) Skin cancer prevention counseling is a priority in my practice
- 20) Skin cancer prevention for Arizona patients is something that concerns me
- 21) Counseling patients about skin cancer prevention takes too much time
- 22) Counseling patients about skin cancer prevention is a good use of my time
- 23) Counseling patients about skin cancer prevention is within my scope of practice
- 24) I feel obligated to counsel my patients about skin cancer prevention
- 25) Advice from nurse practitioners can help patients decrease their skin cancer risk
- 26) Counseling from a nurse practitioner will influence an patient's skin cancer risk-reducing behaviors.
- 27) A patient's phenotypic factors (e.g. numerous moles, fair skin) affect my decision to provide skin cancer prevention counseling
- 28) A patient's genetic factors (e.g. personal or family history) affect my decision to provide skin cancer prevention counseling.

Section 4 (Practice Behaviors)

Items below are scored on a 7 point Likert-type scale ranging from 1 (extremely unlikely) to 7 (extremely likely)

1 2 3 4 5 6 7

How likely are you to recommend the following behaviors to your patients in the general population (i.e., not at increased risk of skin cancer):

- 29) Use SPF 30 or higher sunscreen
- 30) Avoid sun exposure during the peak hours of 10 am to 2 pm
- 31) Wear sun protective clothing (hats, long sleeves, etc.)
- 32) Seek shade when outdoors during the day

How likely are you to recommend the following behaviors to your patients at an increased risk of skin cancer:

- 33) Use SPF 30 or higher sunscreen
- 34) Avoid sun exposure during the peak hours of 10 am to 2 pm
- 35) Wear sun protective clothing (hats, long sleeves, etc.)
- 36) Seek shade when outdoors during the day

How likely are you to do the following activities for your patients:

Items are scored on a 7-point Likert-type scale ranging from 1 (Extremely unlikely) to 7 (Extremely likely)

1 2 3 4 5 6 7

- 37) Assess the patient's ultraviolet radiation exposure
- 38) Assess the patient's sunscreen use
- 39) Assess the patient's barriers to sunscreen use
- 40) Assess the patient's use of other methods of sun protection (e.g., sun protective clothing, sun avoidance)
- 41) Provide skin cancer primary prevention resource materials
- 42) Advise and counsel patients about skin cancer primary prevention
- 43) Follow an established practice guideline for skin cancer primary prevention counseling
- 44) Choose the established skin cancer prevention counseling recommendation or practice guideline that you prefer to use in practice:

American Academy of Dermatology
 National Cancer Institute
 United States Preventive Service Task Force
 American Academy of Family Physicians
 Other (specify):
 None

Section 5 (Intervention Satisfaction)

Items are scored on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree)

- | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 45) Overall, the information presented in the PowerPoint presentation was useful to my practice | | | | | | | |
| 46) I learned new information about skin cancer prevention | | | | | | | |
| 47) The length of the presentation was too long | | | | | | | |
| 48) I had enough time to view the full presentation | | | | | | | |
| 49) I could easily access the presentation link | | | | | | | |
| 50) The audio component added to the presentation | | | | | | | |
| 51) I would recommend this presentation to my colleagues | | | | | | | |
| 52) I could easily navigate the presentation | | | | | | | |
| 53) Comments/suggestions: | | | | | | | |

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