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UNIVERSITY OF SAN DIEGO
Hahn School of Nursing and Health Science
DOCTOR OF PHILOSOPHY IN NURSING

SKIN CANCER RISK PERCEPTION AND SUNSCREEN USE IN
ADOLESCENT FEMALE SOCCER ATHLETES

by

Cheryl L. Butera, MSN, APRN, FNP-BC, NP-C, PHN

A dissertation presented to the
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Dissertation Committee

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Abstract

Over 3.5 million cases of skin cancer are diagnosed annually in the United States. In adolescent females ages 15–19, melanoma is the second most common form of cancer. The greatest risk factor for skin cancer is ultraviolet rays from the sun. Research has shown that sunscreen use is protective of all skin cancers, especially melanoma. The purpose of this study was to obtain perceptions about risk of skin cancer and sunscreen use among 13- to 18-year-old adolescent female club soccer athletes as a basis for effective interventions to improve sunscreen use in this population. The Health Belief Model was employed as the theoretical framework. A mailed self-administered questionnaire was used in this cross-sectional, descriptive, correlational study of adolescent female soccer athletes in a local San Diego club. A response rate of 33% resulted in a total of 77 participant questionnaires being examined. Demographic information and data were analyzed using descriptive and nonparametric inferential statistics. Study findings suggested that participants had considerable differences in overall perceptions of skin cancer risk and sunscreen use. The Health Belief Model construct that displayed the highest mean score across items was perceived severity while the lowest score related to perceived barriers suggesting that participants perceive the seriousness of skin cancer and perceived few obstacles that would prevent them from using sunscreen. Significant positive correlations were found between sunscreen use before practices and scores on the perceived susceptibility and benefits subscales. Significant positive correlations were also found between sunscreen use before games and perceived benefits subscale scores, parent

encouragement, and teammate encouragement to use sunscreen. Chi-square analyses on all subscale items and athlete covariates with sunscreen use before practices and games determined six significant statements which can be used clinically in athlete healthcare encounters to assess use of sunscreen before practices and games. The findings of this study validate the need for sunscreen application education for this large, growing adolescent population. Nurses in schools, sports clubs, and primary care settings are in a unique position to develop innovative sun protective education programs and to advocate for youth club sport policies addressing sun protective behaviors.

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by

Cheryl L. Butera

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Dedication

To my parents who taught me to value family, education, hard work, and God's beauty in all its many forms.

To my husband Don who empowered me with his constant love, humor, and encouragement throughout this educational journey.

To my children Brian, Jeff, and Mariah who challenged and inspired me through their own educational efforts to never stop learning.

My appreciation goes out to you all for creating and enriching the fabric of my life.

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I would also like to thank the San Diego Surf Soccer Club who graciously allowed me access to their club members. I am grateful as well to all of the female adolescent soccer club athletes who participated in this study. It was a joy to get to know all of you and your families while promoting and encouraging participation in this study.

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Chapter 1

Introduction

The skin, a component of the integumentary system, is the largest organ in the human body. It covers a surface area ranging from 1.2 to 2.3 square meters (16 to 49 square feet) and accounts for up to 16% of the body's weight (Bickley & Szilagyi, 2009). Composed of continually growing, differentiating, and renewing tissue, the skin provides three main functions for the body: sensation, regulation, and protection. It is the body's first and best line of defense as a protective barrier against physical, chemical, bacterial, and environmental agents. As an anatomical protective barrier, the skin is uniquely subjected to harmful and damaging environmental conditions. The most serious environmental hazard for the skin is chronic, excessive exposure to the ultraviolet (UV) rays of the sun, which can cause skin cell DNA damage and, ultimately, skin cancer (American Cancer Society [ACS], 2013). Skin cancer and its prevention have become a major public health and primary care area of concern.

Background

Despite a large and ongoing national public health education program for skin cancer prevention by the American Cancer Society, the incidence of skin cancer has continued to rise. In the United States, on average, one person dies of skin cancer every hour. Over 3.5 million new cases of skin cancer, more than all other types of cancer

combined, are diagnosed each year (ACS, 2013). Basal cell and squamous cell carcinomas are the most frequently diagnosed malignancies in the United States (Centers for Disease Control and Prevention [CDC], 2012). Melanoma, the most lethal form of skin cancer, was responsible for more than 75% of the 12,650 U.S. skin cancer deaths in 2013 (ACS, 2013). The greatest risk factor for skin cancer is well known to be ultraviolet light radiation exposure from the sun (Howlader et al., 2012). Sun damage to skin occurs over time with chronic, intermittent, and intense exposures. Research has shown that broad spectrum sunscreen is preventive for all forms of skin cancer and decreases the incidence of melanoma by up to 50% (Green, Williams, Logan, & Strutton, 2011).

Significance

Adolescence is a time in life when prolonged periods of sun exposure are common (Green, Wallingford, & McBride, 2011). The incidence of melanoma in adolescence has significantly increased over the last 20 years. In females 15 to 19-years of age, melanoma is now the second most common form of cancer (Brenn & McKee, 2008). Skin cancer is preventable if sun protective behaviors, such as sunscreen, are utilized. For this reason, assessing skin cancer risk perception and the preventive behavior of sunscreen use in adolescent female populations with increased sun exposure is of paramount importance in the prevention of all types of skin cancer.

Youth club soccer athletes are a specific adolescent female population with increased sun exposure. Over the last 20 years, the phenomenon of youth clubs for all sports has blossomed in the United States. This phenomenon can most clearly be seen in youth soccer, especially for females. According to the United States Youth Soccer Association (2012) there are 1.5 million registered club female soccer athletes, and of

these over one million are between the ages of 13 and 18 years. Typically, these adolescent female athletes have been playing outdoor soccer since the age of five. If they displayed strong athleticism, talent, and interest, they were funneled into competitive rather than recreational youth soccer clubs. These competitive soccer clubs have as an ultimate goal to develop female soccer athletes who will eventually have the skills to play on college, national, Olympic, or professional teams. Athletes in these competitive youth clubs are trained more intensely and spend significantly more time outside exposed to the sun than recreational players. On average, these soccer athletes spend at least 10 hours weekly, year round, on the practice and game field often during peak hours of UV radiation (United States Youth Soccer Association, 2012). These female adolescent club soccer athletes clearly are at increased risk for skin cancer due to long term chronic, repetitive, and intense sun exposure from a very young age. Assessing this high-risk population for an association between perceived risk of skin cancer and the use of sunscreen as a preventive behavior is extremely important in sustaining long-term prevention of skin cancer disease.

Theoretical Framework

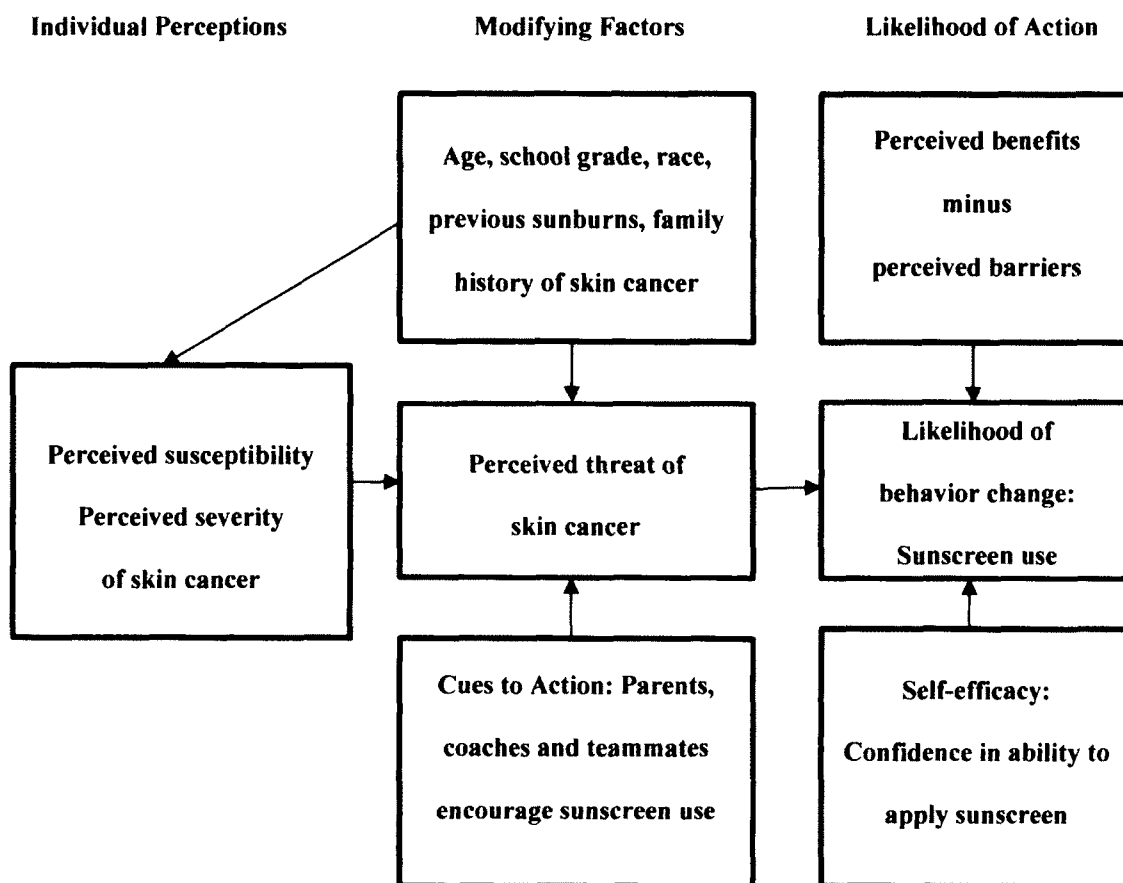
The health belief model (HBM), created by Rosenstock (1974), was the theoretical framework used in this study. The HBM, one of the first theories of health behavior, was initially developed in the early 1950's by a group of United States Public Health Service social psychologists, Hochbaum, Rosenstock and Kegels, to explain the behavior of people with respect to chest X-rays for tuberculosis (Hochbaum, 1956). Rosenstock (1966) further developed the HBM, studying the incentives and differing responses to utilization of public health care services. In a monograph published in 1974,

Rosenstock reviewed the origins of the HBM as well as his expanded theory and model. In 1988, Rosenstock, Strecher and Becker added two new constructs to the model, cues to action (motivation) and self-efficacy.

The HBM postulates that an individual's health-related behavior is dependent on perceptions of four basic constructs: the severity of a potential condition, personal susceptibility to the condition, benefits of taking preventive action, and barriers to taking preventive action. Individuals are believed to be ready to make a behavior change only if they believe they are susceptible to the condition, believe the condition is serious, and believe that taking action, that is changing a health-related behavior, would be beneficial and would outweigh potential costs. Individuals must also be confident that they can perform a specific health-related action and be capable of the health behavior change.

The HBM focuses on the relationship between an individual's health beliefs and resulting behaviors. It provides a way to understand, explain, and predict how individuals will act with respect to specific health behaviors. In this study, the HBM's four main constructs were used to understand the preventive behavior of sunscreen use based on perceptions of severity of skin cancer, susceptibility to skin cancer, the benefit of a preventive health action (sunscreen use), and barriers to taking a preventive health action. These constructs and their interrelationships are depicted in Figure 1.

Figure 1. Theoretical Framework for the Study-The Health Belief Model.



Study Purpose

The purpose of this study was to explore perceptions about risk of skin cancer and use of sunscreen among 13- to 18-year-old adolescent female club soccer athletes and to examine the relationship of risk perception to sunscreen use. The ultimate goal was to use the resulting information to design an effective intervention to improve sunscreen use in this population.

Research Questions

The following research questions were addressed:

1. What were the perceptions regarding skin cancer among 13- to 18-year-old adolescent female club soccer athletes?
2. Was there a relationship between risk perception of skin cancer and sunscreen use?
3. Was the relationship between risk perception of skin cancer and sunscreen use influenced by specific athlete characteristics (age, school grade, race, family history of skin cancer, previous sunburns, or parental, coach and teammate support of sunscreen use)?

Research Design

The design for this study was a cross-sectional, descriptive, correlational, survey. Cross-sectional study designs are often used to acquire data at one particular point in time in an attempt to understand a phenomenon. Descriptive research most commonly has as its goal the discovery of people's characteristics and the frequency with which a phenomenon occurs. Correlational studies examine the relationships among variables of interest without any interventions. Finally, survey research is non-experimental and gathers information on people's beliefs, attitudes and activities utilizing a variety of different question formats (Polit & Beck, 2012). This design was most appropriate to explore skin cancer risk perception and sunscreen use in 13- to 18-year-old adolescent female club soccer athletes because no previous published studies had been conducted addressing this phenomenon in this population.

Definition of Concepts

The concepts for this study were, by definition, abstractions of phenomena of interest. These abstractions were conceptualized from different perspectives and at different levels. Important concepts embedded in this study are defined below in order to

understand their contextual meaning, clarify key variables, and understand how variables were measured.

Theoretical definitions. The following constitute the theoretical definitions of relevant study constructs:

- Risk perception for skin cancer: An individual's beliefs, knowledge, and attitudes regarding the likelihood of developing skin cancer.
- Sunscreen: A broad spectrum cream, lotion or spray formulation containing chemical ingredients that protect the skin by blocking damaging ultraviolet A and B radiation from the sun with a sun protective factor (SPF) of 15 or greater.
- Adolescent female: An individual of female gender in her teenage years (13-18) transitioning physically, psychosocially, and emotionally from childhood to adulthood (Burns, Dunn, Brady, Starr, & Blosser, 2009).
- Soccer club athlete: A youth registered and formally trained in a competitive soccer club environment that competes at the highest levels in the sport of soccer.

The following were definitions of the constructs of the health belief model:

- Perceived susceptibility: An individual's assessment of the possibility of acquiring or developing a particular condition or disease, in this case, skin cancer.
 - Perceived severity: An individual's assessment of the seriousness and potential threat to life of a particular condition or disease – skin cancer.
 - Perceived benefits: An individual's assessment of the advantages of adopting a specific preventive action to decrease the risk of a particular condition or disease.
- In this instance, the preventive action to be studied was sunscreen use.

- **Perceived barriers:** An individual's assessment of negative obstacles, including cost and inconvenience, that discourage adopting a specific preventive action to decrease the risk of a particular condition or disease. In this study, negative obstacles might have included ignorance of how to select or apply sunscreen and lack of funds with which to purchase sunscreen.
- **Cues to action:** People, events, or messages that motivate individuals to change their health related behaviors. An example of a health behavior changing message would be a coach or parent verbally encouraging the use of sunscreen.
- **Self-efficacy:** An individual's confidence in performing a specific positive health action (Glanz, Rimer, & Lewis, 2002). Belief in one's ability to apply sunscreen effectively would have demonstrated confidence in performing a positive health action.

Operational definitions. The list below includes operational definitions of some study variables:

- **Risk perception of skin cancer:** Risk perceptions of skin cancer were measured using the adapted Shelestak & Lindow HBM survey questionnaire.
- **Sunscreen use:** Sunscreen use was measured by two statements added to the instrument: "I apply sunscreen before all soccer practices" and "I apply sunscreen before all soccer games."
- **Adolescent female:** Adolescent female was measured through stated years of age (13 to 18) in the demographic portion of the survey instrument.
- **Soccer club athlete** was assessed through verification of registration as a member of a specific southern California soccer club.

Summary

Skin cancer is a significant public health problem. Skin cancer in the adolescent population is increasing, especially among females (Green, Wallingford, & McBride, 2011). Young adolescent female athletes, particularly those engaged in year round outdoor club sports, such as soccer, are exposed to chronic and intense UV rays from a young age resulting in an increased risk for skin cancer. Examining risk perceptions for skin cancer and associated sunscreen use in this high-risk population is of paramount importance to prevent skin cancer and promote long-term health. Primary care nurses are well positioned in a variety of outpatient settings to intervene with this population and provide important education on skin cancer prevention behaviors and long-term wellness.

Chapter 2

Review of Literature

The incidence of skin cancer has increased over the last 20 years both in the United States and globally (World Health Organization, 2013). In the United States, it is estimated that one in five Americans will develop skin cancer in their lifetimes (American Academy of Dermatology, 2013). Skin cancer is a major public health problem. The main predisposing factor in the development of skin cancers, especially melanoma, is chronic, intermittent, intense exposure to the environmental hazard of ultraviolet rays of the sun acquired from a young age, commonly during recreational activities (National Cancer Institute, 2013). Key aspects in controlling this public health problem of skin cancer are perceptions, beliefs, and attitudes about this disease and its prevention.

For the purpose of clarity, the literature review for this study was broken down and organized into the following conceptual areas: (a) the theoretical concepts surrounding skin cancer - the sun and ultraviolet radiation; (b) sunscreen protection and use; (c) adolescence and skin cancer risk; (d) young adolescent athletes and skin cancer risk perception; (e) older adolescent athletes and skin cancer risk perception; and (f) research using the Health Belief Model in health care.

The Sun and Ultraviolet Radiation

The sun, a star almost 4.5 billion years old, emits radiation in the form of ultraviolet rays which are commonly known as sunlight. The sun and its ultraviolet rays, while necessary to sustain life, in excess are an environmental hazard to which all of the earth's population is exposed (Halliday, Byrne, & Damian, 2011). The International Agency for Research on Cancer of the World Health Organization delineated all categories and wavelengths of UV radiation as a Group 1 carcinogen, thereby recognizing that there is now enough evidence to definitively conclude that UV radiation from the sun causes skin cancer in humans (Lucas, 2010).

Sunlight consists of a mixture of electromagnetic waves ranging from infrared to ultraviolet that are visible and invisible to the human eye (Pidwirny & Vranes, 2012). Ultraviolet radiation is made up of three wavelengths: UVA, UVB, and UVC. The UV spectrum is continuous with each waveband being classified according to its wavelength and associated harmful effects. UVA has a long wavelength (320-400 nm). This wavelength penetrates deeply into the skin and causes Vitamin A destruction, with wrinkling and aging of the skin as well as indirect DNA cell damage in the form of oxidation and free radical formation.

UVB rays have a mid-range wavelength (290-320 nm) penetrating the skin superficially, and, while they induce Vitamin D synthesis, they also cause Vitamin A destruction. UVB rays are also responsible for skin aging and sunburn and play a decisive role in some forms of skin cancer (Harrison & Bergfeld, 2009). Exposure to UVB rays causes skin erythema or sunburn, which causes the body to produce more of the brown

skin pigment melanin through the process of melanogenesis. This suntan or increase of pigmentation is a direct reflection of skin cell DNA damage by UVB rays.

UVC rays are the shortest, yet highest energy, wavelength (less than 290 nm).

UVC rays are filtered out of our atmosphere by the ozone layer and so, for the most part, do not contribute to skin damage in humans (Skin Cancer Foundation, 2013). UVA, UVB and potentially UVC rays can all damage collagen fibers of the skin and thereby promote skin aging. The ultraviolet rays of the sun can create a variety of skin problems.

Protection from these hazardous rays of the sun is the only way to avoid serious skin damage.

Ultraviolet Radiation Protection and Sunscreen Use

Sunscreen has been well studied and documented as a product that provides protection from the harmful effects of UVB rays of the sun. Within the last few years, however, several significant studies have been conducted that have led to a better understanding of the harmful effects to the skin of the deeply penetrating and more DNA-damaging UVA rays. A study reviewing the epidemiological data on UVA rays and their potential involvement with cutaneous melanoma, found that application of sunscreen to prevent sunburn, UVB ray-induced damage, inadvertently increased exposure to UVA rays by blocking UVB rays and thereby enabling and enhancing UVA's effects on the skin. This finding was then used to explain the slightly higher rate of melanoma found among sunscreen users and to explain the conflicting results of some previous studies (Autier, Dore, Eggermont, & Coebergh, 2011).

Another experimental study utilizing compare-and-contrast in vitro skin models, demonstrated that, although UVA rays are less energetic than UVB rays, they penetrate

more deeply into the dermis and play a major part in dermal structure deterioration and the aging process (Battie & Verschoore, 2012). In yet another experimental study, two groups (control and intervention) of hairless mice were exposed to UVA light wavelengths through a solar simulator which mimicked natural sunlight. One group had a UVA-and UVB-protective sunscreen applied (intervention); the other group received no sunscreen (control). The mice were sacrificed and portions of skin were then removed. Skin cells were stained and assessed microscopically. Skin cell DNA single strand breaks were discovered along with oxidized free radical chemicals, all of which indicated skin cell damage, in the control group but not in the intervention group (Svobodova et al., 2012). The preceding studies all uncovered, emphasized, and demonstrated the need for UVA-band sunscreen protection, not just UVB-band protection as previously believed, and the overall importance of sunscreen use.

Finally, a landmark follow-up, randomized controlled trial study provided what is believed by many to be conclusive evidence that regular sunscreen use can prevent not only basal cell and squamous cell carcinomas, but also cutaneous melanomas (Green, Williams, Logan, & Strutton, 2011). A community-based skin cancer prevention trial was conducted in Nambour, Queensland, Australia. From 1992 to 1996, 1,621 randomly selected residents 25 to 75 years of age were given sunscreen and assigned to daily or discretionary/no sunscreen use groups. Participants were observed until 2006 through surveys and national melanoma cancer registries. Ten years after cessation of the trial and with subsequent follow-up, 11 new primary melanomas were found in the daily sunscreen use group while 22 melanomas were found in the discretionary/no use group (hazard ratio [HR], 0.50; 95% CI, 0.24-1.02; $p = .051$). The reduction in invasive

melanomas was impressive with three cases of invasive melanoma being found in the intervention group and 11 in the control group (HR, 0.27; 95% CI, 0.08-.97) compared with pre-invasive melanoma (HR, 0.73; 95% CI, 0.29-1.81). These findings suggest that melanoma is preventable with daily use of sunscreen. This study is generalizable to those people living in sunny climates and those vacationing in sunny locales. In summary, this study provides reassurance that melanoma is preventable and that sunscreen is protective of ultraviolet radiation from the sun's rays with regular, daily use.

The American Cancer Society (ACS, 2013), the Centers for Disease Control and Prevention (CDC, 2012), the American Academy of Dermatology (2013), and the Skin Cancer Foundation (2012) are only a few of the many health organizations that endorse sunscreen as a protective product in the prevention of all types of cutaneous skin cancers and encourage regular, daily sunscreen use with reapplication every 2 hours. Responding to the new research and evidence on sunscreen, the U.S. Food and Drug Administration (2012) established new regulations stipulating that all sunscreens should be “broad spectrum” products including ingredients that provide protective coverage for both UVA and UVB rays at a minimum sun protective factor (SPF) of 15.

SPF, a grading system, quantifies only the degree of UVB ray protection from erythema/sunburn provided by a sunscreen (Balk, 2011). For example, a SPF of 15 provides protection for 150 minutes for a person who would usually experience sunburn in 10 minutes, (15 x 10 minutes). For a sunscreen to provide UVA protection, one or more of the following ingredients should be included: ecamsule, avobenzone, oxybenzone, titanium dioxide, or zinc oxide (Antoniou, Kosmadaki, Stratigos, & Katsambas, 2008). In mandating inclusion of chemicals which block both the harmful

UVA and UVB rays of the sun, a broad spectrum sunscreen product resulted providing maximal skin protection with regular use (National Cancer Institute, 2013).

Adolescence and Skin Cancer Risk

Adolescence, due to biological and hormonal changes, has been found to be a physiological period in an individual's life when he or she is physically highly susceptible to the harmful effects of the sun's rays, although these effects are latent and may not fully manifest their damaging results until years later (Balato, Balato, Balato, & Monfrecola, 2008). In a recent study, a theoretical incidence-based model was constructed and researchers ultimately found that approximately 50% of lifetime ultraviolet rays were obtained by American youth before the age of 18 (Stern, 2010).

Green, Wallingford, and McBride (2011) reviewed recent epidemiological literature and evidence relating to UV sun exposure during childhood and teenage years. Their findings suggested that actinic skin changes and damage are clearly linked to the incidence of adult melanoma. According to the American Academy of Dermatology (2013), early lifetime sun exposure distinctly places adolescents at a significant increased risk for all skin cancers, especially melanoma.

A conceptually new biological theory has been proposed stating that adolescents are at significantly increased risk for melanoma. This theory is based on findings that young melanocytes are physiologically more active. This heightened activity level of melanocytes means that they are more susceptible to UV carcinogenesis and alteration of melanocyte DNA through sun exposure and sunburns acquired during youth, given that peak melanocyte activity and neovogenesis occurs early in life (Green, Wallingford, & McBride, 2011). It can be concluded from this research, that adolescents have physical,

physiological, and biological factors innately predisposing them to an increased risk for skin cancer. They are theoretically and realistically a population at high risk for skin cancer.

Young Adolescent Athletes and Skin Cancer Risk Perception

There is a paucity of literature examining the skin cancer risk perceptions of the younger adolescent athlete, particularly the female athlete. Few studies have been done on athletes in early adolescence regarding skin cancer beliefs, behaviors, and sunscreen use. Cohen, Tsai, and Puffer (2008) examined sun protective perceptions and behaviors among high school and young college athletes in Los Angeles, California. In this cross-sectional survey study, 1,006 students from 2 high schools and 1 public university participated. Athlete participants were recruited from pre-participation sports physical examinations while non-athlete controls were recruited from physical education classes. Overall, sun protective behaviors (SPB) were low for both groups, with the university athletes having higher sunscreen use during non-sports activities than the non-athlete control group (37.7% vs. 32.3%, $p=0.03$). Similar results were found in the high school subjects.

A qualitative study, by Paul and colleagues explored adolescent athletes' self-reported reasons for protecting themselves from the sun. This study was conducted in three Australian high schools in which a total of seventeen focus groups differed by age and gender. Interestingly, male and female athletes ages 12 to 14 reported not protecting themselves from the sun because they perceived no long-term salient risk from the sun and believed skin cancer was easily treated. In addition, female athletes ages 12 to 14 reported using sun protective behaviors, including sunscreen, only if they were visibly

burned. Both genders and all age groups, but most especially the 16-to 17-year-olds, reported that their desire for a fashionable tan resulted in not using sun protection. These beliefs and attitudes reflect the common adolescent perception of invincibility which leads them to believe that somehow the consequences of their high-risk behaviors, that is, skin cancer, will not affect them (Wickman, Anderson, & Greenberg, 2008). This study ultimately concluded that peers, the fashion industry, and authority figures could all positively affect adolescent sun-protective behaviors for both genders and all adolescent age groups (Paul, Tzelepis, Parfitt, & Girgis, 2008).

In 2009, Fulmore conducted a two phase sequenced exploratory mixed methods design study to examine high-school-age adolescent athletes' beliefs and perceptions about sun protection and skin cancer. In phase one, the researcher used cognitive interviews to assess how athletes understood questions asked and then developed an instrument. In phase two, the researcher piloted the instrument, established reliability, and checked for construct validity using factor analysis. A larger study was next conducted with the validated instrument on 803 high school adolescent athletes (56% female, 44% male and overall 76% White) representing 108 schools and each state board district. In conclusion, it was found that adolescent athlete perceptions of skin cancer risk and sun protective behaviors including sunscreen use were increased when they were interviewed and instructed individually regarding risk and sunscreen use (Fulmore, 2009).

Another study assessed comparative optimism regarding skin cancer, that is, the belief that an individual is at lower risk of cancer than his or her age mates, among adolescent athletes in two adjacent age groups 11- to 12-year-olds and 13- to 14-year-

olds. Twenty-one male and female students looked at either fair skinned or tanned models. Students then answered questions assessing comparative optimism for skin cancer as adults. Results indicated that the 13- to 14-year age group was the most optimistic group and were less likely than their younger peers to believe they would have a negative health event such as the development of skin cancer. (Roberts, Gerrard, & Alert, 2011).

Recently, Saridi, Bourdaki, and Rekleiti (2014) sought to explore young adolescent high school students' perceptions regarding sun-related risk, sun protection measures including sunscreen use, and resulting sunburn incidence in a cross-sectional, descriptive, correlational study. No significant correlation was found for perceptions of sun-related risk or sun-protective measures with sunburn incidence. The authors concluded that a continued effort to educate adolescents regarding sun protective beliefs and attitudes was needed for them to adopt wiser solar-protective behaviors.

Finally, a very recent randomized controlled trial study was conducted on 50 high school students in Northern California to assess the effect of appearance-based education compared with health-based education on sunscreen use and knowledge of skin cancer risk. In a simple, non-stratified randomization scheme, 25 participants were assigned to the appearance-based video group and 25 to a health-based video group. Participants viewed either an appearance-based video on UV induced premature aging or a health-based video emphasizing UV exposure and skin cancer risk. Results indicated that the appearance-based video group demonstrated a significant increase in sunscreen use (2.8 ± 2.2 , $p < .001$). Between-group comparisons showed that the appearance-based group applied sunscreen at significantly greater frequencies compared to the health-based group

(2.2 ± 1.4 vs 0.2 ± 0.6 , $p < .001$). Skin cancer risk knowledge significantly improved in both groups. From this study, it was concluded that the appearance-based video was more effective in promoting sunscreen use and skin cancer knowledge in adolescents (Tuong & Armstrong, 2014).

In summary, these limited studies illustrate that more research needs to be conducted to examine and understand young adolescents' and adolescent athletes' perceptions of personal risk of a negative health outcome such as skin cancer and their resulting sun-protective behaviors.

Older Adolescent Athletes and Skin Cancer Risk Perception

A number of studies have been conducted with National Collegiate Athletic Association (NCAA) college athletes, ages 18- to 22 years, regarding skin cancer risk perception and other pertinent variables, including use of sunscreen (NCAA, 2011). Dubas and Adams (2011), in an experimental cluster randomized controlled trial study, looked at the association of the availability of sunscreen to its application among female college golf athletes. Ten Midwest regional colleges in 4 states participated. The ten NCAA Division I female golf teams ($N=83$) were randomized through a computer algorithm into 2 groups, a control group ($N=39$) and a treatment group ($N=44$). The treatment group was given sunscreen in their locker rooms and in their golf bags. Both groups were given verbal and written instructions as well as a self-administered survey before and after the study. All questionnaires were completed. The results showed that although there was no statistically significant difference before the intervention between the treatment and control group, after the intervention the treatment group significantly increased its sunscreen use ($p=.01$). There was a 20% increase in use of sunscreen and re-

application of sunscreen for athletes for whom sunscreen was made readily available compared to the control group. This study has good generalizability and suggests that increased sunscreen accessibility would support increased use by athletes.

A second cross-sectional survey study examined attitudes, personal characteristics, and barriers associated with sunscreen use among NCAA Division I male and female collegiate athletes at high risk for skin cancer (N=290) from an east coast and a west coast university. Athletes included in the study were 18 years of age or older and played on one of the following outdoor sports teams: baseball, track, rowing, field hockey, lacrosse, golf, soccer, swimming, water polo or tennis. Findings indicated that, although 96% of the athletes understood that sunscreen was preventive for skin cancer, over 50% did not use sunscreen. Among those that did use sunscreen, only 75% applied it three or more days in the week. Significant predictors of sunscreen use were: west coast university location ($p=.03$), sport (field hockey, lacrosse, soccer, [$p<.001$]), female gender ($p=.002$), number of sunburns in the last year ($p=.01$), belief in risk for skin cancer as an athlete ($p<.001$), knowing someone with skin cancer ($p=.01$), having ever had a skin exam ($p<.001$), and being worried about wrinkles, sunburns, or skin cancer ($p<.001$). A significant increase in odds of ever using sunscreen was seen in athletes from the west coast university (OR 1.95, 95% CI [1.10-3.48] and in females (OR 2.40 [CI 1.30-4.44]). The generalizability of this study is decreased as athletes at only two elite universities were examined. This study found that despite understanding that sunscreen prevents skin cancer; use of sunscreen did not improve. Conclusions drawn from this study are that athletes need further education in skin cancer risk and prevention (Wysong et al., 2012).

A third study of NCAA college athletes located in colleges in the southern United States was conducted assessing the frequency and formulation of sunscreen use, positive coach and parental encouragement of sunscreen use, and the impact of family history of skin cancer on sunscreen use. With the coaches' approval, a link for an anonymous internet-based survey was emailed to them to forward to their college team athletes for voluntary participation. A total of 274 athletes participated in this cross-sectional survey, 70% female, and 30% male, and 58% resided in southern areas of the United States. Findings indicated that females used sunscreen more frequently ($p=.0001$) than males. Rare use of sunscreen defined as 25% of the time occurred in 60.95% of participants while only 10.58% reported consistent use ($>75\%$ of the time). Spray on sunscreen was preferred by 52.24% of the athletes, and 157 (57.3%) of the athletes stated that parents and coaches recommended use of sunscreen. Athletes who were encouraged to use sunscreen did in fact use sunscreen more frequently ($p<.0001$) (Ellis, Mohr, Indika, & Salkey, 2012).

A family history of skin cancer was not correlated with sunscreen use. The results of this study suggest that, although sunscreen formulations are deemed acceptable, even with parental and coach's encouragement, sunscreen protection is not being used on a regular basis by college athletes. There is a need for increased education on use of sunscreen. This study has two potential biases: unequal representation of male and female participants and recall bias due to self-report. These biases decrease the credibility of study findings (Ellis, et al., 2012).

Another study, an anonymous cross-sectional survey, was conducted by Hamant and Adams (2011) to assess the degree of sunscreen use in male and female college

athletes at high risk for excessive sun exposure due to their sport. The study's sample consisted of soccer and cross country NCAA athletes with a mean age of 20 from four Midwestern universities. Of the 186 study participants (89 females, 97 males), 85% (158) stated that they had not used sunscreen in the previous week of practice, with an additional 6% (11) describing sunscreen use on only 3 of the previous 7 days. There were no statistically significant differences in frequency of sunscreen use between males and females, sports, ages, school years, or schools. No athlete reapplied sunscreen during practice. The findings from this study suggest that primary prevention and education about UV sun damage to the skin of college athletes needs to be improved. The generalizability of this study is limited as only two NCAA sports were examined in one area of the country.

Finally, a recent survey study by Jinna and Adams (2013), once again on NCAA college athletes, found that sun safety education programs were effective in improving overall athlete sun protective behaviors including sunscreen use. The recommendations developed from this study were that school sports organizations should institute sun protective regulations and policies including but not limited to sun exposure regulations, sunscreen use, availability of locker room sunscreen, and frequent skin screening exams.

In summary, a number of studies have been conducted on skin cancer risk perception, sunscreen use, and various other variables in the older adolescent college athlete population. None of the above studies have examined either the young high school age or older college age adolescent athlete who plays an outdoor sport year round, a club sport, for skin cancer risk perception and the sun-protective behavior of sunscreen use.

Selected Research Using the Health Belief Model

The HBM is the most commonly used theory in health promotion and health education research (Glanz, Rimer, & Lewis, 2002). Since the HBM's inception in the 1950's, it has been used extensively in health care research. A chronologic, historical, representative overview of the HBM's use in the literature will be presented here.

In 1978 Becker et al. successfully tested the HBM in a compliance study utilizing primary care asthma protocols. In the mid 1980's and early 1990's, three separate, yet related, studies utilized the HBM as a conceptual framework to (a) develop an instrument for performing breast self-examinations (BSE) based on its constructs, (b) to determine the needed frequency/schedule of BSEs, and (c) to examine breast cancer screening behaviors (Champion, 1984, 1985, 1993). Again, in the early 1990's, the HBM and its constructs were employed in a research study to understand and examine adolescent fertility control (Eisen, Zellman, & McAlister, 1992). Somewhat later in the 1990's, a study dealing with osteoporosis and its prevention in young women utilized the HBM's theoretical framework, emphasizing the construct of self-efficacy in preventing this condition (Sedlak, Doheny, & Jones, 1998).

In 2005, Bost conducted a study and explained barriers to college health center access through an extensive analysis of the constructs of the HBM. A few years later, Chen, Yi, Wu, and Li (2007) attempted to explore and explain why some individuals decide to participate in annual influenza vaccinations by looking at the individual's perceptions through the lens of all six of the HBM's constructs. Most recently, utilizing the HBM as a conceptual framework, two sequential related studies were conducted in an attempt to first determine public awareness, knowledge, and beliefs regarding skin self-

exams in the prevention of skin cancer and subsequently to develop and then test the resulting instrument (Shelestak & Lindow, 2009, 2011). As can be seen from these representational varied and numerous studies, the HBM has a long, prolific, and substantial history of use as a conceptual framework in health care research.

Summary

The review of literature suggests that older adolescent and young adult NCAA college athletes who practice and play outdoor sports in their college settings have been studied for beliefs regarding risk of skin cancer and several other variables, including sunscreen use. Few similar studies have been done on the younger adolescent high school athlete. While both of these high school and college age athlete groups who practice and play for a few months each year during their season have in some way been studied, no research can be found on younger or older adolescent club athletes, who practice and play their sport outdoors all year round. Specifically, the outdoor year-round club sport of soccer, which is the most played club sport by adolescent females in the United States, has not been studied (Health Day News, 2008). No studies have been done on this distinct population of adolescent female soccer athletes at high risk for skin cancer, nor have their sun protective perceptions, beliefs, and behaviors, including sunscreen use, been examined. Risk perceptions for actually developing skin cancer from excessive sun exposure due to participation year-round in one's sport have been minimally addressed, at best, and definitely not from the female adolescent athlete's perspective.

Based on the literature, there is a knowledge gap. The population of adolescent female club soccer athletes at high risk for skin cancer has not been examined with respect to their risk perceptions, beliefs about, and attitudes toward skin cancer or their

sun-protective behavior of sunscreen use. Finding an association between perceived risk of skin cancer and use of sunscreen in this intensely sun-exposed, at-risk population would help to fill this knowledge gap. This type of association would validate the need to educate this large and growing population of adolescent athletes regarding the risks of sun exposure and the need for sunscreen application. Additional information on this population is sorely needed. It is imperative that this young and adaptable population of over 1 million female athletes participate in preventive activities to help alleviate the inevitable harmful short-and long-term skin damage and disease effects due to early chronic and excessive sun exposure associated with their sport.

Chapter 3

Methods

The purpose of this study was to obtain perceptions about risk of skin cancer and use of sunscreen in the adolescent female club soccer athlete population. This chapter presents the research methodology used to answer the following research questions:

1. What were the perceptions regarding skin cancer among 13- to 18-year-old adolescent female club soccer athletes?
2. Was there a relationship between risk perception of skin cancer and sunscreen use?
3. Was the relationship between risk perception of skin cancer and sunscreen use influenced by specific athlete characteristics (age, school grade, race, family history of skin cancer, previous sunburns, or parental, coach, and teammate support of sunscreen use)?

Presentation of the research methodology includes the research design; setting; sample; sample selection criteria and recruitment; data collection, including the instrument, variables, and procedures; and data analysis methods. Ethical protection of human subjects is also discussed.

Design

A cross-sectional, descriptive, correlational survey design was used in this study to explore the relationship between skin cancer risk perceptions and sunscreen use among

adolescent female club soccer athletes 13- to 18-years-of age. This quantitative study used a non-experimental design as no treatments or interventions were imposed upon the independent variable of risk perception of skin cancer (Polit & Beck, 2012). Since no previous published studies had addressed this phenomenon in this population, this study design was considered most appropriate to explore the variables' relationships.

Descriptive data were collected at one point in time through a self-administered questionnaire (SAQ) and analyzed using numeric and statistical procedures to examine perceptions and associations among the variables of skin cancer risk perception and sunscreen use in 13- to 18-year-old adolescent female club soccer athletes (Field, 2009). This study was intended to serve as a starting point for understanding variable relationships and enable future theory generation and interventions to improve sunscreen use. Advantages of a cross-sectional, correlational survey research design included realism of results, convenience of data collection, cost effectiveness, and data that are typically generalizable (Davies & Logan, 2012). Disadvantages of this study design were the inability to infer cause-and-effect relationships among variables and potential sampling and response bias (Polit & Beck, 2012).

Setting and Sample

All study participants were members of the premier competitive youth soccer club, San Diego Surf, established in 1980 in Del Mar, California. This competitive soccer club's mission is to develop competitive soccer players with superior soccer skills, teamwork, and sportsmanship to compete at the highest levels of the sport (San Diego Surf Premier Soccer Club, 2013). The entire club consisted of approximately 950 male

and female soccer athletes. There were a total of 60 teams, 30 male and 30 female. Players ranged in age from 6- to 18- years of age. The age criterion for each team was designated by players' ages as of August first of any particular year. As an example, if an athlete became 14-years of age after August first of a particular year of play, he or she was placed on an Under 14 team. For the purpose of this study, female soccer athletes between 13- and 18-years of age were studied. The teams examined were, therefore, the Girls Under (GU) 14, 15, 16, 17 and 18.

There were three teams at each of these age levels. Each team was composed of 16 to 18 players for a total possible participant number of 240. A sample of 62 participants provided 80% power to discover whether a correlation was statistically significant at the 2-tail alpha level of 0.05 (Polit & Beck, 2012). Since mailed questionnaires typically achieve response rates of less than 50%, 240 surveys were mailed to achieve the target sample size (Huck, 2012).

Participant selection criteria. Athlete participants were selected based on the following inclusion criteria:

1. Active, registered members of the San Diego Surf Premier Soccer Club located in Del Mar, California. In order to obtain mailing addresses for surveys sent to participants, current registration was needed.
2. Females, 13- to 18-years of age, and playing on one of the three teams in each age bracket labeled Girls Under (GU) 14, GU15, GU16, GU17, or GU18. This study's purpose was to examine an adolescent female club soccer athlete population and so these team ages and gender were essential.

- 3 Had played outdoor competitive, year-round soccer for a minimum of three years along with participation in a minimum of 10 hours per week year-round on the soccer practice and game fields. This degree of previous soccer experience and weekly practice and game time was the norm for all Surf Soccer Club athletes.
- 4 No personal history of skin cancer.
- 5 English-speaking and able to read and write at a 6th grade level. This criterion was necessary to ensure vocabulary and reading comprehension of the survey questions and selection of appropriate answers.

Soccer club members in other age categories, those with a past personal history of skin cancer, and non-English-speakers were excluded from the study.

Participant recruitment strategy. Permission to conduct this study was granted through a telephone conversation between the primary investigator (PI) and both the Vice President of Operations and the Head Coach of the San Diego Surf Premier Soccer Club in Del Mar, California. A formal meeting was arranged by the primary investigator (PI) with the Vice President of Operations, and copies of the survey questionnaire, cover letter, parent consent, and youth assent forms were presented during the meeting. Home addresses for all female club soccer athletes on the GU14 thru GU18 teams were obtained.

A number of actions were taken to proactively increase survey response rates. A study logo was created in the San Diego Surf soccer club's colors consisting of three teen females in soccer gear juggling a soccer ball (Appendix A). This logo was printed on all study envelopes and the cover page explaining the study. The survey envelope's return address was printed as "SOCCER STUDY," in club colors to draw attention to the

subject of the study envelope. All addresses were hand-written to help individualize the envelopes. Addressed envelopes, including the return-addressed envelopes, were stamped not business-bulk stamped, to again personalize the letter. In addition, a request was made for the study to be advertised and participation encouraged in the weekly club email newsletter. Results of this study will also be published in this weekly email newsletter. Finally, permission was requested to distribute flyers describing the study (Appendix B) to age-appropriate teams at practices during a specified two-week period before survey letters were to be mailed.

Data Collection

Data were collected through the use of a self-administered questionnaire (SAQ). First, a discussion of the instrument and the variables measured will be undertaken; next, procedures for data collection are discussed.

Survey instrument and variables. The original study instrument, Shelestak and Lindow's self-administered questionnaire, "Perceptions & Practices Regarding Skin Cancer Prevention," was adapted for this study to measure the variables of skin cancer risk perception and sunscreen use. The original instrument emerged from results of a qualitative study of health beliefs and skin cancer prevention practices (Shelestak & Lindow, 2009). It took approximately 15 minutes to complete and consisted of 34 statements created to measure beliefs rooted in constructs of the Health Belief Model (Shelestak & Lindow, 2011). This instrument was reviewed by dermatological experts for appropriateness and accuracy. It had a Flesch-Kincaid reading level of 4th grade 7th month. The advanced multivariate statistical method of exploratory factor analysis with varimax rotation was used to determine the underlying structure that explained the set of

concepts in each of the four main construct subscale areas and also establish the validity of the instrument.

There were four main areas on the instrument, each with its own subset of health and construct-specific statements. Each statement area corresponded to one of the HBM's constructs of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers and also included related general health preventive practices. In the adapted version of this instrument (Appendix C), only Health Belief Model construct statements pertaining specifically to skin cancer were retained.

Item responses were entered on a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument was designed to measure perceptions and beliefs regarding skin cancer and therefore was appropriate to effectively assess the independent variable of risk perception of skin cancer in this population. The instrument was also adapted to measure the dependent variable of sunscreen use in this study by adding the following two statements: (a) "I apply sunscreen before all soccer practices," and (b) "I apply sunscreen before all soccer games." In addition, five covariates were identified and measured by adding the following statements to the survey: (a) "A member of my family has had skin cancer," (b) "I have had at least one blistering sunburn in my life," (c) "My parent(s) has always encouraged me to use sunscreen when playing soccer," (d) "My coach has always encouraged me to use sunscreen when playing soccer," and (e) "My teammates encourage me to use sunscreen when playing soccer." The final adapted instrument consisted of a total of 32 statements. In addition, the following pieces of demographic information were requested on the questionnaire: (a) age, (b) grade in school, and (c) race/ethnicity. An email request for

permission to use this instrument was sent to the author, Dr. Debra Shelestak (PI), and her email granting permission was received (Appendix D).

Procedures. Study envelopes were created by the PI. In order to ensure confidentiality, each envelope was assigned a coded number. All study envelopes were mailed out and addressed specifically to the athlete's parent(s) as most study participants were expected to be minors under the age of 18. Study envelopes contained: (a) a cover letter explaining the study (Appendix E), (b) two copies of a parent/guardian consent form (Appendix F), (c) two copies of an athlete youth assent form (Appendix G), (d) the adapted survey questionnaire (Appendix C), (e) two numbered tickets for inclusion in an incentive drawing for an Apple-mini, 32 GB iPad (Appendix H), and (f) a stamped, addressed return envelope. In addition, reminder postcards (Appendix I) were created and sent to all participants two weeks after the initial mailing date. Each participant's questionnaire, consent, assent, raffle ticket, and return envelope had the same coded number. All forms needed to be returned. Completion and return of consents and the questionnaire provided confirmation of the voluntary nature of participation in this study.

Data Analysis

The Likert scale, named after its originator psychologist Rensis Likert, is a widely used composite measure of attitudes that involves a scaling technique that sums scores on a group of statements that participants rate for their degree of agreement or disagreement (Likert, 1932). The 5-point Likert-type scale used in this study was defined as: 1 (strongly disagree), 2 (disagree), 3 (neutral/uncertain), 4 (agree), and 5 (strongly agree). The instrument for this study was composed of 32 declarative statements when adapted to include the two dependent and five covariate statements. The participants in this study

were asked to indicate the extent to which they agreed or disagreed with the variety of statements related to skin cancer knowledge and beliefs as well as sunscreen use by marking their level of agreement on the defined scale. Each subscale area and its items were individually scored and added together for a total subscale score. Sunscreen use at practices and games as well as each of the covariate items were scored individually. Using SPSS statistical package software version 22, each self-administered questionnaire's four subscale constructs' total scores were correlated separately with their corresponding practice and game sunscreen use score. Using the nonparametric statistical test of Spearman's rank order correlation or Spearman's rho (r_s) for test of association, a moderate correlation ($r = .3$) between perceived risk of skin cancer and sunscreen use was considered meaningful (Polit & Beck, 2012).

Demographic information was analyzed using descriptive statistics (frequency, percentage, mean, standard deviation [SD]). Descriptive statistics were also employed in analyzing and summarizing data trends in descriptive research questions. Nonparametric inferential statistics (Spearman's rho correlations, and Chi-square analyses) were used to correlate, compare, and examine relationships between the variables of interest, that is, risk perception of skin cancer, athlete characteristics, and sunscreen use at practices and games.

Protection of Human Subjects

In this study, ethical considerations related to human subjects were addressed. Prior to conducting the study, all procedures were reviewed and approved by the Institutional Review Board (IRB) of the University of San Diego (Appendix J) to ensure the proposed study plan met federal requirements for ethical research. All parental

consents and youth assent forms were required to be signed and included in the returned survey envelope prior to participant enrollment in the study. Completion and return of the survey were considered voluntary consent for involvement in this study. All surveys, consents, assents, raffle tickets, and return stamped addressed envelopes were coded with the same participant code number to ensure confidentiality. All research data was kept in a locked file cabinet in the PI's home office. This study was of a voluntary nature with the individual participant making the choice to participate or not participate. This study was of a non-experimental design and of minimal risk, that is, it did not incur any physical, emotional, or economic risks greater than those ordinarily experienced in everyday life. A benefit to the participant was the opportunity to win an Apple-iPad mini-Wi-Fi 32 GB, a much desired item in the adolescent population. This benefit was also viewed as an incentive to participate in this study (Singer & Couper, 2008).

Summary

This chapter presented the cross-sectional, descriptive, correlational survey design that was used to examine the relationships among the variables of risk perceptions of skin cancer, sunscreen use, and selected participant characteristics among 13- to 18-year- old adolescent female club soccer athletes. The research methodology, which encompassed the sampling plan, data collection procedures, and approach to data analysis, was presented. Measures for ethical consideration and protection of human subjects were also addressed.

Chapter 4

Findings

This chapter will be organized into two sections and present the findings from data analysis of this cross-sectional, descriptive, correlational, survey study. The first section will include a description of the study sample. The second section will report study data and data analysis for each of the three research questions and will include the statistical approaches used, results, interpretation, and conclusions derived.

Characteristics of the Study Sample

Approval was granted to conduct this study by the University of San Diego's Institutional Review Board (Appendix J). Permission was also given by the Vice President of Operations for the San Diego Surf Soccer Club for member athletes to participate in the study. A one-hour evening meeting was arranged and the study PI presented the proposed study to all age-appropriate team managers, coaches, and the soccer club board. Following this meeting, the PI spent the next two weeks attending late afternoon/evening GU 14 to GU 18 team practice sessions. Two hundred and fifty study flyers (Appendix A) were handed out to female soccer athletes, coaches, and parents. Questions regarding the study were answered and all athletes were encouraged to participate in the survey.

On April 1, 2014 two hundred and forty code-numbered envelopes consisting of a survey questionnaire, two copies of a parent/guardian consent form, two copies of an athlete youth assent form, two numbered drawing tickets and a stamped addressed return envelope were sent out by United States mail to registered, actively playing San Diego Surf Soccer Club female athletes between the ages of 13 and 18. Two weeks later, reminder postcards were sent out via U.S. mail to all athletes. The survey collection period ended on May 31, 2014.

Seventy-eight or 33% of the surveys were returned and included signed parent and youth consent forms as well as the athlete's incentive drawing ticket. Mailed questionnaires typically achieve response rates of less than 50% and when surveying the special population of adolescents, response rates are often much lower (Huck, 2012). The adolescent response rate in this study of 33% was about 3% higher than the reported response rates in other mailed adolescent healthcare survey studies (Richards et al., 2010; Church, 2013).

Survey questionnaires that were returned and used in this study were scored and included in the data analysis only when all items were complete. One questionnaire was omitted as some statements were unanswered. A total of 77 survey questionnaires were analyzed. All statistical analyses were conducted using the Statistical Program for Social Sciences (SPSS) version 22 for Windows.

Demographic information on the survey questionnaire included age, grade in school, and race/ethnicity. Table 1 summarizes participants' demographic data for age, grade, and race/ethnicity. The sample consisted of 77 adolescent female club soccer athletes with an average age of 15.69 years ($SD = 1.37$ years).

Participants were predominantly White/Caucasian (70.1%) and a large percentage was in the 11th grade (27.3%). The most frequently reported age for study participants was 16-years. There were no Black/African American or Native American/American Indian participants in this study. The demographic finding related to race/ethnicity from this club soccer sample reflects the demographic profile of this club's location in North County San Diego (County of San Diego Health and Human Services Agency, 2013).

Table 1

Participants' Ages, Grade in School, and Race/Ethnicity (N = 77)

Demographic variable	N	(%)
Age (Mean=15.7, SD=1.4)		
13 years	5	(6.5%)
14 years	13	(16.9%)
15 years	13	(16.9%)
16 years	21	(27.3%)
17 years	20	(26.0%)
18 years	5	(6.5%)
Grade level		
7th grade	1	(1.3%)
8th grade	10	(13.0%)
9th grade	11	(14.3%)
10th grade	18	(23.4%)
11th grade	21	(27.3%)
12th grade	16	(20.8%)
Race/Ethnicity		
Asian or Pacific Islander	3	(3.9%)
Black or African American	0	(0%)
Hispanic, Latino or Mexican	10	(13.0%)
Native American/American Indian	0	(0%)
White or Caucasian	54	(70.1%)
Multi-racial	10	(13.0%)

Research Questions and Data Analysis

The purpose of this study was to obtain perceptions about risk of skin cancer and use of sunscreen among 13- to 18-year-old adolescent female club soccer athletes and to examine the relationship of risk perception to sunscreen use. The adapted Shelestak and Lindow instrument used in this study was designed to measure perceptions and beliefs regarding skin cancer and is therefore appropriate to effectively assess the independent variable of risk perception of skin cancer in this sample population. The instrument was adapted to also measure the dependent variable of sunscreen use as well as five covariates. Descriptive and inferential statistical techniques were used to analyze data. Descriptive statistics were employed in analyzing and summarizing data trends in descriptive research questions of perceptions and beliefs about skin cancer. Nonparametric inferential statistics were used to correlate, compare, and examine associations between the variables of interest. The following section presents findings related to each research question for this study.

Research question 1. What were the perceptions regarding skin cancer among 13- to 18-year-old adolescent female club soccer athletes?

Participants responded to statements on the adapted Health Belief Model (HBM)-based instrument by Shelestak and Lindow , “Perceptions and Practices Regarding Skin Cancer Prevention,” on a 1 to 5 Likert-type scale with 5 indicating strong agreement, 4 agreement, 3 neutral or uncertain, 2 disagreement, and 1 strong disagreement. Data were collapsed into two categories combining the two disagree categories (strongly disagree and disagree) and the two agree categories (strongly

agree and agree) and eliminating the neutral/uncertain category. This instrument was used to assess perceptions regarding skin cancer, that is, risk perception of skin cancer in this adolescent female athlete population. The instrument has four subscales each of which corresponds to one of the four specific HBM constructs of susceptibility, severity, barriers, and benefits. Each subscale area and its associated responses are explored in this section in order to understand participant's risk perception regarding skin cancer. HBM construct means were analyzed. In addition, findings related to covariates and the dependent variables of sunscreen use, all included through adaptation of the instrument, were assessed. Differences in sunscreen use at practices and games were also investigated.

Five statements, SU7, SU8, SE5, SE6, and SE7, were reverse coded in the data analysis. The adapted instrument's overall reliability or Cronbach's α was .60. Cronbach's α s for each of the four subscale areas were (a) susceptibility (SU) .64, (b) severity (SE) .68, (c) barriers (BA) .49, and (d) benefits (BE) .57. It is desirable for the Cronbach's α for a scale to be above 0.7 (DeVellis, 2003). Cronbach's alpha values are very sensitive to the number of items in a scale, however, and in scales with fewer than ten items, such as all four of this adapted instrument's subscales, it may be more appropriate to look at mean inter-item correlations for reliability with an optimal range being .2 to .4 (Briggs & Cheek, 1986). Mean inter-item correlations for each subscale were as follows: (a) susceptibility .20, (b) severity .23, (c) barriers .14, and (d) benefits .26.

Perceived susceptibility (SU). The perceived susceptibility subscale of the adapted survey instrument consisted of eight items. Reverse scoring of items SU7

and SU8 was done to consistently indicate that a Likert scale answer of 1 or 2 (disagree) reflected a lower perception of susceptibility to skin cancer. Table 2 presents results regarding participant's perceived susceptibility to skin cancer. Percentages recorded in the tables do not total 100% due to exclusion of neutral responses.

Respondents were moderately concerned about getting skin cancer (SU4) and perceived their chances of getting skin cancer (SU1 and SU3) as relatively high, yet they were unlikely to agree that their overall health made them susceptible to skin cancer (SU2). Very few believed that they would develop skin cancer in the next 5 years, a finding congruent with adolescents' typical developmental perceptions of invulnerability. This last finding is congruent with the perception voiced by most participants that only old people get skin cancer (SU8). Most respondents also mistakenly agreed with the perception that dark-skinned individuals are at less risk for skin cancer. Since more than 70% of participants were White, this finding is congruent with the moderately high perceptions of perceived risk found in SU1, SU3 and moderate levels of concern (SU4 and SU6).

Table 2

Perceived Susceptibility to Skin Cancer

Perceived Susceptibility	Disagree N (%)	Agree N (%)
SU1. My chances for getting skin cancer are high.	12 (15.6%)	39 (50.7%)
SU2. My overall health makes it likely that I will get skin cancer.	57 (74%)	7 (9.1%)
SU3. My lifestyle increases my chances of getting skin cancer.	13 (16.9%)	51 (66.2%)

SU4. I am concerned about getting skin cancer.	16 (20.8%)	35 (45.5%)
SU5. I believe I will get skin cancer in the next 5 years.	65 (84.5%)	1 (1.3%)
SU6. I am afraid of getting skin cancer.	13 (16.9%)	49 (63.7%)
<hr/>		
Reverse scored Items	Agree N (%)	Disagree N (%)
<hr/>		
SU7. People with dark skin don't have to worry about skin cancer.	61 (79.3%)	3 (3.9%)
SU8. Only older people get skin cancer.	62 (80.5%)	4 (5.2%)
<hr/>		

Perceived severity (SE). The perceived severity subscale of the adapted instrument consisted of seven items. Reverse scoring of items SE5, SE6, and SE7 was once again performed to consistently indicate that a Likert scale answer of 1 or 2 (disagree) reflected a lower perception of severity of skin cancer. Table 3 displays results related to participants' perceived severity of skin cancer. The percentages stated in the tables do not total 100% as neutral responses were excluded. While respondents indicated moderate perceptions that skin cancer was not as serious as other types of cancer (SE1), they agreed with the perception that people do die of skin cancer (SE6) and reported moderate perceptions that skin cancer was expensive to treat (SE2) and not easy to cure (SE5). Participants were more likely to disagree than to agree that they would die of skin cancer (SE3), but they strongly agreed that their soccer would be affected if they did get skin cancer (SE4). These beliefs are consistent with the participants' adolescent cognitive developmental stage and reflect typical age-related

perceptions of invincibility and concrete thinking focused on the present. Athlete participants also tended to perceive that checking their skin was not as important as checking their blood pressure (SE7). This finding is congruent with the perceptions by many that skin cancer was not as serious as other types of cancer (SE1) and that the participants do not believe there is a strong possibility they could die from skin cancer (SE3).

Table 3

Perceived Severity of Skin Cancer

Perceived Severity	Disagree N (%)	Agree N (%)
SE1. Skin cancer is much more serious than other types of cancer.	32 (41.6%)	7 (9.1%)
SE2. Skin cancer is very expensive to treat.	9 (11.7%)	42 (54.6%)
SE3. There is a strong possibility that I could die from skin cancer.	34 (44.2%)	22 (28.6%)
SE4. My soccer would be affected if I got skin cancer.	12 (15.6%)	56 (72.8%)
Reverse Scored Items	Agree N (%)	Disagree N (%)
SE5. Skin cancer is easily cured.	9 (11.7%)	43 (55.9%)
SE6. Nobody dies from skin cancer.	3 (3.9%)	72 (93.5%)
SE7. Checking my skin isn't as important as checking my blood pressure	26 (33.8%)	9 (11.7%)

Perceived barriers (BA). The perceived barriers subscale of the adapted instrument consisted of six items. Table 4 portrays participants' perceived barriers to taking skin cancer preventive action and sunscreen use. Item percentages do not equal 100% as neutral items were omitted. Respondents generally perceived that sunscreens were not too expensive to buy (BA1) nor was it too expensive to have healthcare providers check their skin (BA6). These perceptions could very well be related to not only the fact that these athletes are minors being financially supported by parents, but also that the typical socio-economic level of girls who play club soccer in North County San Diego is moderately high and therefore costs for sunscreen and healthcare are affordable (County of San Diego Health and Human Services Agency, 2013).

Although more respondents disagreed than agreed that checking their skin was too time consuming (BA2), participants were close to being evenly divided in their perceptions regarding the actual usefulness and value of regularly checking their skin as a preventive action for skin cancer (BA3). Participants reported moderately high perceptions that they did not know what to look for when checking their skin (BA4) and that it would be easier to check their skin if someone helped them (BA5). Both of these perceptions reflect not just a lack of knowledge as to what to look for when checking skin but also a lack of self-efficacy or self confidence in being able to adequately perform the preventive health action of a skin exam.

Table 4

Perceived Barriers to Sunscreen Use

Perceived Barriers	Disagree N (%)	Agree N (%)
BA1. Sunscreens are too expensive for me to buy.	70 (90.9%)	3 (3.9%)
BA2. Checking my skin takes too long.	27 (35.1%)	21 (27.3%)
BA3. Checking my skin regularly won't prevent me from getting skin cancer.	31 (40.3%)	28 (36.4%)
BA4. I don't know what to look for when checking my skin.	13 (16.9%)	56 (72.8%)
BA5. It would be easier to check my skin if someone helped me.	9 (11.7%)	51 (66.3%)
BA6. It's too expensive to have a healthcare provider check my skin.	49 (63.7%)	4 (5.2%)

Perceived benefits (BE). The perceived benefits subscale of the adapted instrument contained four items. Table 5 presents results regarding participants' perceived benefit of taking a skin cancer preventive action. Neutral responses were excluded and so percentages do not add up to 100%. Almost all of the participants in this study perceived the importance of applying sunscreen before going outside in the daytime (BE3), and many of them perceived the importance of limiting their time outside when the sun was strongest (BE1). Conversely, many disagreed with the importance of keeping their skin covered while outside (BE2) or performing a thorough skin exam every month (BE4). These findings

suggest that although sunscreen use and some sun protective behaviors are perceived to be beneficial (BE1 and BE3), there are still inaccurate perceptions of some actions (BE2 and BE4) in the prevention of skin cancer.

Table 5 *Perceived Benefits to Sunscreen Use*

Perceived Benefits	Disagree N (%)	Agree N (%)
BE1. I should limit my time outside when the sun is strongest.	23 (29.9%)	36 (46.8%)
BE2. Keeping my skin covered when I am outside is important to me.	38 (49.4%)	17 (22.1%)
BE3. I should always apply sunscreen before going outside in the daytime.	5 (6.5%)	58 (75.3%)
BE4. Doing a thorough skin exam every month is important for me to do.	27 (35.1%)	17 (22.1%)

HBM subscales construct means. Mean item scores were calculated for each of the health belief model constructs of perceived susceptibility, severity, barriers, and benefits. All scores were based on the previously mentioned 5-point Likert scale, but some items were reverse scored as indicated above. Table 6 summarizes the mean scores, standard deviations and range for each HBM construct subscale. The highest mean item score was for perceived severity 3.4, while the lowest mean score was for barriers, 2.7. This result suggests that participants viewed skin cancer as relatively serious and perceived few obstacles that would prevent them from taking a specific skin cancer preventive action such as sunscreen application.

Table 6

Mean Scores for Health Belief Constructs (N = 77)

Health Belief Construct	Mean (SD)
Susceptibility	3.3 (.49)
Severity	3.4 (.55)
Barriers	2.7 (.50)
Benefits	3.0 (.65)

Covariates. Each of the five covariate items was measured individually on the previously described 5-point Likert scale with a range of 1 to 5. Each covariate statement's data was collapsed into two categories combining the two disagree categories (strongly disagree and disagree) and the two agree categories (strongly agree and agree) and eliminating the neutral/uncertain category. Covariate frequencies and their related percentages are presented in Table 7.

Covariate items for which there was a considerable response difference between the percent of participants who agreed and disagreed included, "my parent(s) has always encouraged me to use sunscreen when playing soccer," "a member of my family has had skin cancer," "my teammates always encourage me to use sunscreen when playing soccer," and "my coach has always encouraged me to use sunscreen when playing soccer." Parental encouragement to use sunscreen was much more likely to occur than teammate or coach

encouragement. This finding suggests that parental encouragement to use sunscreen when playing soccer is the most frequent cue to action in sunscreen use among all covariate variables for this female adolescent soccer athlete population.

Table 7

Covariates for Sunscreen Use

Covariates	Disagree N (%)	Agree N (%)
1. A member of my family has had skin cancer.	30 (39.0%)	42 (54.6%)
2. I have had at least 1 blistering sunburn in my life.	39 (50.7%)	35 (45.5%)
3. My parent(s) has always encouraged me to use sunscreen when playing soccer.	4 (5.2%)	73 (94.8%)
4. My coach has always encouraged me to use sunscreen when playing soccer.	26 (33.8%)	27 (35.1%)
5. My teammates always encourage me to use sunscreen when playing soccer.	21 (27.3%)	35 (45.5%)

Sunscreen use. Each of the two health preventive action statements for sunscreen use, “I apply sunscreen before all soccer practices,” and, “I apply sunscreen before all soccer games,” were also measured on a 5-point Likert-type scale with 5 indicating strong agreement and 1 indicating strong disagreement. Data were once again collapsed into two categories combining the two disagree categories (strongly disagree and disagree) and the two agree

categories (strongly agree and agree) and eliminating the neutral/uncertain category. The non-parametric statistical technique of a chi-square test for independence was used to explore the relationship between the two categorical dependent variables of sunscreen use before soccer practices and sunscreen use before soccer games.

A chi-square test was performed and indicated a significant relationship between sunscreen use before practices and before games, $\chi^2 (1, n = 61) = 15.80, p < .001$, with a medium effect size or phi coefficient of .51. Simply stated, athletes that applied sunscreen before games were significantly more likely to apply sunscreen before practices. The relative risk (RR) of adolescent female athletes who do not apply sunscreen before practices was 2.4 (95% CI = 1.72, 3.42) times higher for non-users of sunscreen before games (100%) than for those who applied sunscreen before games (41.3%). Sunscreen use frequencies and percentages before practices and games are shown in Table 8.

Table 8

Sunscreen Use

Sunscreen Use	Disagree N (%)	Agree N (%)
1. I apply sunscreen before all soccer practices.	40 (52.0%)	27 (35.1%)
2. I apply sunscreen before all soccer games.	15 (19.5%)	53 (68.9%)

Research Question 2. Is there a relationship between risk perceptions for skin cancer and sunscreen use?

Scores for each subscale across respondents were computed and entered into SPSS as a total susceptibility score, total severity score, total barrier score, and total benefit score. Similarly, cumulative scores across respondents were calculated for sunscreen application before practices and before games and entered into SPSS separately.

A Spearman's rank-order correlation or Spearman's rho statistical test was performed on all total subscale scores and sunscreen use both before practices and before games. Spearman's rho was used due to the non-parametric nature of the data. Among the four subscale areas, only the perceived susceptibility subscale score ($r_s = .30$, $p = .009$) and the perceived benefits subscale score ($r_s = .24$, $p = .03$) had significant positive correlations with sunscreen use before practices. Perceived susceptibility accounted for 9% (r_s^2) and perceived benefits accounted for an additional 5.8% (r_s^2) of the variability in sunscreen use at practices, together accounting for a total of 14.8% of the variance in sunscreen use. Other possible factors that may be contributing to the variance in sunscreen use could be lack of availability of sunscreen or simply, forgetting to apply sunscreen.

Only the perceived benefits subscale score ($r_s = .31$, $p = .007$) had a significant positive correlation with sunscreen use before games, accounting for 9.6% (r_s^2) or approximately 10% of the variance in this variable. Table 9 presents correlations of HBM subscale scores with the sunscreen use scores before practices and before games.

Table 9

Correlation Coefficients for Subscale Scores and Sunscreen Use Before

Practices and Games (N = 77)

		Sunscreen use practices	Sunscreen use games	Susceptibility subscale score	Severity subscale score	Barriers subscale score	Benefits subscale score
Spearman's rho	Sunscreen use practices	1.00	.64**	.30**	.11	-.08	.24*
	Sunscreen use games		1.00	.22	.01	-.09	.31**

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Likert-scale 1 to 5 scores for each statement in each of the four subscales were collapsed into two categories, as was previously done for sunscreen use before practices and games, combining the two disagree categories (strongly disagree and disagree) and the two agree categories (strongly agree and agree) and eliminating the neutral/uncertain category. Chi-square 2 x 2 analyses were performed with each subscale statement individually-for both sunscreen use before practices and before games to further explore the relationship between risk perception of skin cancer and sunscreen use. In several Chi-square analyses, there was at least one cell in which there was an expected frequency less than five. As a result of this Chi-square assumption being violated, the Fisher Exact Test significance or “p” was reported at a 2-tailed $\alpha < .05$ instead of the Pearson Chi-square significance.

Two items in the perceived susceptibility scale (SU4, SU6) displayed significant relationships with sunscreen use. The statement SU4, “I am concerned about getting skin cancer,” displayed significant differences between

sunscreen users and nonusers at both practices ($\chi^2 [1, n = 44] = 5.14, p = .044$) and games ($\chi^2 [1, n = 44] = 5.97, p = .027$) with phi coefficients of .34 and .36 respectively. Failure to use sunscreen at practices was 1.7 (95% CI = 1.13, 2.60) times more likely for those female athletes who were not concerned about getting skin cancer (85.7%) than for those concerned about getting skin cancer (50%). Similarly, failure to use sunscreen at games was 3.2 (95% CI = 1.22, 8.36) times higher for those athletes not concerned about getting skin cancer (50%) than for those concerned about getting skin cancer (15.6%). There was also a significant difference in reported sunscreen use at games based on responses to statement SU6, “I am afraid of getting skin cancer,” ($\chi^2 [1, n = 57] = 10.9, p = .003$) with a phi or effect size of .44. Failure to use sunscreen at games was 4.4 (95% CI = 1.80, 10.60) times more likely for those athletes who were not afraid of getting skin cancer (58.3%) as for those athletes who were (13.3%).

Only one item in the perceived severity subscale, (SE6 – “nobody dies from skin cancer”) showed a significant difference in sunscreen use before games, ($\chi^2 [1, n = 66] = 7.01, p = .049$) with a phi effect size of .33. Athletes who believed no one dies of skin cancer were 4.9 times less likely to use sunscreen than athletes who believed people can die from skin cancer. Items on the perceived barriers subscale showed no significant differences between sunscreen users and nonusers before practices or games.

Finally, in the perceived benefits subscale, responses to one item (BE2), “keeping my skin covered when I am outside is important to me,” displayed a

significant difference between sunscreen use and nonuse before practices (χ^2 [1, $n = 48$] = 5.68, $p = .026$) and before games (χ^2 [1, $n = 48$] = 8.0, $p = .004$), with phi coefficients of .33 and .41 respectively. Failure to use sunscreen at practices was 1.9 times more likely among those who did not believe in keeping their skin covered while outside (75%) than for those who believed in keeping their skin covered (40%). However, this finding was not statistically significant (95% CI = .981, 3.58). Failure to use sunscreen at games was 1.6 (95% CI = 1.22, 2.09) times more likely among those who did not believe in keeping their skin covered while outside (37.5%) than for those who believed in keeping their skin covered (0.0%). Table 10 presents significant Chi-square and Fisher Exact Test results for HBM subscale items and sunscreen use before practices and games.

Table 10

Chi-Square Test, HBM Subscale Items and Sunscreen Use at Practices/Games

	N	χ^2	<u>Practices</u>			χ^2	<u>Games</u>		
			p	phi	RR 95% CI		p	phi	RR 95% CI
Perceived Susceptibility Subscale									
SU4. I am concerned about getting skin cancer.	44	5.14	.044*	.34	1.7 1.13, 2.60	5.97	.027**	.36	3.2 1.22, 8.36
SU6. I am afraid of getting skin cancer.	57					10.9	.003**	.44	4.4 1.80, 10.60
Perceived Severity Subscale									
SE6. Nobody dies from skin cancer.	66					7.01	.049**	.33	4.9 3.03, 7.99
Perceived Benefits Subscale									
BE2. Keeping my skin covered when I am outside is important to me.	48	5.68	.026*	.33	1.9 ^b .981, 3.58	8.0	.004**	.41	1.6 1.22, 2.09

*p < .05

^a Fisher Exact Test p

^b RR (relative risk) not significant

Research Question 3. Is the relationship between risk perception of skin cancer and sunscreen use influenced by specific athlete characteristics (age, school grade, race, family history of skin cancer, previous sunburns, and coach, teammate, and parental support of sunscreen use)?

Spearman rho correlations and Chi-square analyses were the statistical approaches used to explore the influence of specific athlete characteristics (age, school grade, race, family history of skin cancer, previous sunburns, and coach, teammate, and parental support of sunscreen use) on the relationship between risk perception of skin cancer and sunscreen use before practices and games.

A Spearman rho correlation was performed on study covariate athlete characteristics and sunscreen use before practices and before games. No correlations were found with sunscreen use before practices. Only parent encouragement of sunscreen use at games ($r_s = .246, p = .031$) and teammate encouragement of sunscreen use at games ($r_s = .33, p = .033$) displayed significant correlations. These correlations were significantly positive and indicated that when parents and teammates encouraged sunscreen use before games, sunscreen use increased. Parent and teammate encouragement of sunscreen use accounted for 6.1% and 10.9% (r_s^2) respectively, or 17% of the variability in sunscreen use before games. Table 11 presents covariate correlations with sunscreen use before practices and before games.

Table 11

Correlation Coefficients for Covariates and Sunscreen Use Before Practices and Games (N = 77)

		Sunscreen use practices	Sunscreen use games	Family member had skin cancer	Blistered sunburn in life	Parents encourage sunscreen use	Coach encourage sunscreen use	Team- mates encourage sunscreen use
Spearman's rho	Sunscreen use practices	1.00	.64**	.138	.160	.048	-.001	.099
	Sunscreen use games		1.00	.109	.180	.246*	.168	.330**

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Likert-scale 1 to 5 scores for each covariate statement were collapsed into two categories combining the two disagree categories (strongly disagree and disagree) and the two agree categories (strongly agree and agree) and

eliminating the neutral/uncertain category. A chi-square analysis was performed with both sunscreen use before practices and before games for each dichotomized covariate and each demographic variable in order to determine the influence of specific athlete characteristics on the relationship between risk perception of skin cancer and sunscreen use. In several chi-square 2 x 2 covariate analyses there were one or more cells with an expected frequency of less than five. In these analyses the Fisher Exact Test significance was reported at a 2-tailed $\alpha < .05$. For chi-square testing with contingency tables larger than 2 x 2 (demographic variables), p-values were based on all cases with valid data. Table 12 summarizes the findings of chi-square analyses of demographic variables, covariates, and sunscreen use before soccer practices and games.

Chi-square analyses of the demographic variables of age, grade and race/ethnicity found no statistically significant differences in sunscreen use before practices or before games. When analyses were performed for covariates, only parent encouragement, ($\chi^2 [1, n = 68] = 11.09, p = .009$) and teammate encouragement of sunscreen use, ($\chi^2 [1, n = 48] = 6.83, p = .015$), at games were found to have a significant relationship with sunscreen use. Both covariates, parent encouragement and teammate encouragement, had moderate phi's or effect sizes of .40 and .38 respectively (Cohen, 1988). Failure to apply sunscreen before games was 5.4 (95% CI = 3.25, 9.03) times more likely for those not encouraged by parents to use sunscreen (100%) than those whose parents encouraged sunscreen use (18.5%). Similarly, failure to apply sunscreen before games was 3.65 (95% CI = 1.28, 10.36) times higher for those athletes

who did not receive teammate encouragement to use sunscreen (47.1%) than those who received teammate encouragement (12.9%). These findings suggest that the relationship between risk perception of skin cancer and sunscreen use is influenced by parent and teammate encouragement to apply sunscreen at soccer games.

The lack of correlation of coach encouragement to use sunscreen before practices ($r_s = -.001$, $p = .99$) or games ($r_s = .168$, $p = .14$) is significant in its ostensible absence. Since coaches are at both practices and games and are an important presence and influence on athletes, their encouragement is essential in improving the regular use of sunscreen during any type of athletic event.

Table 12

Chi-Square Tests of Demographics, Covariates, and Sunscreen Use at Practices and Games

	Practices				Games			
	N	X ²	df	p	N	X ²	df	p
Age	77	1.36	5	.948 ^b	77	1.58	5	.948 ^b
13 years								
14 years								
15 years								
16 years								
17 years								
18 years								
Grade level	77	3.29	5	.688 ^b	77	2.78	5	.701 ^b
7th grade								
8th grade								
9th grade								
10th grade								
11th grade								
12th grade								
Race/Ethnicity	77	3.21	3	.390 ^b	77	3.23	3	.429 ^b
Asian or Pacific Islander								
Black or African American								
Hispanic, Latino or Mexican								
Native American/ American Indian								
White/Caucasian								
Multi-racial								
CO1. A member of my family has had skin cancer.	62	2.29	1	.130	65	.063	1	.802
CO2. I have had at least one blistering sunburn in my life.	64	1.98	1	.160	66	1.70	1	.192
CO3. My parent(s) has always encouraged me to use sunscreen when playing soccer.	67	2.12	1	.267 ^a	68	11.09	1	.009 ^{a*}
CO4. My coach has always encouraged me to use sunscreen when playing soccer.	47	.045	1	.831	45	2.81	1	.151 ^a
CO5. My teammates always encourage me to use sunscreen when playing soccer.	48	1.16	1	.281	48	6.83	1	.015 ^{a*}

*p < 0.05

^a Fisher Exact Test p^b based on all cases with valid data

Summary

Adolescent female club soccer athletes that participated in this study (N = 77) were an average age of 15.69 years, most commonly in the 11th grade, and primarily of the White/Caucasian race. Subscale item frequencies and percentages suggested that participants had considerable differences in overall perceptions as well as some misperceptions of skin cancer risk and health preventive actions including sunscreen use. HBM construct means indicated that participants perceive the seriousness of skin cancer and perceived few barriers to sunscreen use. A significant difference was found between sunscreen use before practices and games with use before games being more likely. Significant positive correlations were found for sunscreen use before practices and games with both the susceptibility and benefits subscales. Four instrument subscale items were determined to be closely associated with sunscreen use or nonuse, “concern about getting skin cancer,” “fear of getting skin cancer,” “no one dies from skin cancer,” and “the importance of keeping skin covered while outside.” In addition, two covariate variables, parental and teammate encouragement to use sunscreen when playing soccer were found to affect sunscreen use or nonuse in this population. These four subscale item statements and two covariate statements can be used clinically with soccer athletes in health care encounters to help identify female adolescent athletes that do and do not use sunscreen before athletic events.

Chapter 5

Discussion

This chapter addresses four topic areas. Study findings and previous research are discussed in the first section. The second section presents limitations of the study. In the third section, implications of study findings for nursing practice and education are explored. The fourth and last section provides recommendations for future research.

Study Findings and Previous Research

This study's purpose was to explore perceptions of risk for skin cancer and use of sunscreen among 13-to 18-year-old adolescent female club soccer athletes and to examine the relationship of risk perception to sunscreen use as well as specific athlete characteristics that influence this relationship.

Research question 1. With respect to the first research question regarding perceptions of skin cancer among the 13- to 18-year-old adolescent female club soccer athlete, items from all four of the HBM subscales as well as covariate and sunscreen use statement items were assessed for frequency and relative percentage of occurrence. HBM construct subscale means were explored. Sunscreen use at practices and games was examined for relationships. Since no previous research has been done on this adolescent female soccer club athlete population, this study's findings will be

discussed and compared to previous research with other similar age and athlete populations.

Perceived susceptibility. Based on the findings of this study, perceived susceptibility subscale items showed considerable differences in frequencies and percentages of disagreement versus agreement. These differences suggest that while there is a perceived susceptibility to skin cancer that involves concern or fear of getting the disease due to chance or athlete lifestyle, this susceptibility perception is not understood as a present or near future threat. Shelestak and Lindow (2011) also examined perceived susceptibility to skin cancer. Findings from their study suggested that unless participants in some way had direct experience with skin cancer, their perceived susceptibility to personally developing skin cancer was minimal despite having very strong perceptions, beliefs, and preventive practices for skin cancer.

Several other studies, however, had different findings from both the present study and Shelestak and Lindow's studies. For example, Paul, Tzelepis, Parfitt and Girgis (2008) found that there were increased perceptions of susceptibility to skin cancer and of sun protective behaviors among Australian high school adolescents who self-reported that they were susceptible to skin cancer and had a "fear of skin cancer." In another study examining NCAA collegiate athletes, perceptions of being susceptible to skin cancer as an athlete with an active outdoor "lifestyle" proved to be a significant predictor of sun protective behaviors (Wysong et al., 2012).

Perceived severity. In the present study, assessment of perceived severity subscale item differences between frequencies and percentages for disagreement and agreement indicate that while skin cancer is perceived as serious, difficult to cure, and

potentially life threatening, it is not believed to be as serious as other forms of cancer nor do these athletes perceive that severe skin cancer could personally affect them. Findings of the present study have some similarities and differences from previous findings in this area. Shelestak and Lindow (2011) determined in their research on preventive beliefs and practices related to skin cancer that although participants perceived the seriousness of skin cancer, they did not believe they were personally at risk for skin cancer. In Heckman and Coups' (2011) study of sunscreen use among high school students, no relationship between perceived severity of skin cancer and sun protective behaviors, including sunscreen use, was found. In another study directed at sun-exposed adolescent athletes and primary prevention of skin cancer, sun-protective educational information for skin cancer was supplied to athletes. Results showed that athletes engaged in sun protective behaviors at a low level that was not consistent with informed perceptions of the severity of skin cancer (Wiggs, 2007).

Perceived barriers. In this study, the perceived barriers subscale statements showed considerable differences between frequencies and percentages of disagreement and agreement. Cost of sunscreen and performance of self-skin exams or exams by a practitioner were not perceived as barriers to skin cancer prevention although lack of knowledge of abnormal skin findings was perceived as a barrier. Findings from this study are not consistent with prior research. In Hamant and Adams' (2011) study on sunscreen use among collegiate athletes, barriers perceived by athletes that prevented positive skin cancer preventive actions, including sunscreen use, included the expense or unavailability of sunscreen, forgetting to put sunscreen on, being lazy, lacking time,

desiring a tan, and misinformation about skin cancer and its prevention. It is possible that if all of these behaviors had been examined specifically in this study, the perceived barriers to sunscreen use frequencies and percentages would have been higher. Dubas and Adams (2011) conducted a study on sunscreen use and availability among female collegiate athletes. Findings from this study were very similar in terms of perceived barriers identified by athletes in explaining their lack of skin cancer preventive actions despite the fact that sunscreen was purposefully made available to all athletes.

Perceived benefits. When assessing this study's perceived benefits subscale, items once again displayed considerable differences between frequencies and percentages of disagreement and agreement. The benefits of applying sunscreen every day and limiting time outside when the sun is strongest were perceived; however, the benefits of skin cancer preventive actions which involved planning, typically a difficult task for the adolescent, such as having appropriate clothing available to cover the skin when in the sun and monthly skin exams, were not believed to be of benefit in preventing skin cancer. This study's findings are mostly consistent with other research. In their study of sunscreen use in the prevention of skin cancer among high school students, Heckman and Coup (2011) found that students who had increased perceptions of the benefits and importance of protecting their skin through sunscreen use were, in fact, more likely to use sunscreen. Berndt et al. (2011), when exploring the social cognitive correlates of young competitors' sunscreen use found that perceptions of benefits of health protective actions in the prevention of skin cancer increased sunscreen use and sun-protective behaviors.

HBM subscales construct means. In this present study, mean item scores for the Health Belief Model subscale constructs were calculated with the following mean (SD) results: (a) susceptibility 3.3 (.49), (b) severity 3.4 (.55), (c) barriers 2.7 (.50), and (d) benefits 3.0 (.65). The second construct of severity received the highest mean item score while the lowest mean item score was the third construct, barriers. These findings suggest that participants perceived the seriousness of skin cancer while maintaining at the same time a low perception of obstacles (sunscreen costs, healthcare provider visits) that would discourage them from taking a specific skin cancer preventive action, such as sunscreen application. Different findings were obtained when Shelestak and Lindow (2011) conducted a descriptive study to examine perceptions and beliefs about skin cancer and preventive measures. In the present study, perceived severity had the highest mean item score and barriers the lowest while in the Shelestak and Lindow study barriers had the highest mean and susceptibility the lowest. This could possibly be attributed to the fact that the population for this study consisted of financially dependent adolescent females between the ages of 13- and 18, while Shelestak and Lindow's study population was older, perceiving more barriers due to being financially independent, and males/females between the ages of 18 and 65. In this present study, the common adolescent perception of invincibility or the belief that one is too strong to be affected seriously by consequences of high-risk behaviors, such as lack of sunscreen use while in the sun, may very well be influencing these adolescent female athletes' very moderate perception of the severity of skin cancer (Wickman, Anderson, & Greenberg, 2008). The fact that these athletes do moderately perceive the severity of skin cancer

and in addition have low perceptions of barriers to sunscreen use can be viewed as a positive indication that with education and encouragement, sunscreen use can be improved.

Covariates. Covariates in this study consisted of: (a) family history of skin cancer, (b) previous blistering sunburn(s), (c) parent encouragement of sunscreen use when playing soccer, (d) coach encouragement of sunscreen use when playing soccer, and (e) teammate encouragement of sunscreen use when playing soccer. The covariate with the highest frequency and percentage of agreement (73, 94.8%) was, “parent encouragement of sunscreen use when playing soccer,” which suggested that this is the most frequent cue to action for sunscreen use within the context of the HBM for this adolescent female soccer athlete population. Several other previous studies have reported similar findings. Ellis, Mohr, Indika, and Salkey (2012), in their study of sunscreen use in student athletes, found 57.3% of their participants reported that their parents encouraged them to use sunscreen while playing outdoor team sports. Athletes who were encouraged to use sunscreen were much more likely to apply sunscreen ($p < .0001$). Fulmore (2009), conducting an exploratory mixed methods study on predisposing factors for sun protection with adolescent athletes, found that behaviors related to sun protection, including sunscreen use, significantly improved when parents were involved and encouraged them. Similarly, in their study on improving adolescents’ sun protective behaviors related to age and gender, Paul, Tzelepis, Parfitt, and Girgis (2008) determined that the reason, common to both genders and all three of their adolescent age groups, for actual sunscreen application was parent encouragement.

Sunscreen use. Considerable differences were found between frequencies and percentages of sunscreen use before practices and before games. A chi-square analysis was performed and indicated a significant relationship between sunscreen use before practices and games with a medium effect size. The relative risk of adolescent female athletes not applying sunscreen before practices was 2.4 (95% CI = 1.72, 3.42) times higher for non-users of sunscreen before games than for those who did apply sunscreen before games. This finding is congruent with a number of other previous studies' findings suggesting more frequent and consistent sunscreen application before games versus practices in a variety of high school and NCAA college team sports (Wysong et al., 2012; Dubas & Adams, 2011; Wiggs, 2007; Cohen, et al., 2008). Increased application of sunscreen before games may well be related to pre-game rituals and parental presence at games, while decreased use at practices may reflect lack of the presence of parents, arrival at practice directly from school, and lack of coach encouragement to apply sunscreen.

Although the risk of not using sunscreen before practices is greater if an athlete does not apply sunscreen before games, it is important to note that still only 68.9% or about two thirds of the study's participants agreed that they use sunscreen before games. Another consideration is that these athletes have one game per week but practice three or more times per week. Only 35.1% of study participants used sunscreen before practices. This increased number of practices with the related decreased use of sunscreen renders this population of adolescent female athletes at an increased risk for skin cancer. Sunscreen use needs to be improved both at practices and games.

Research Question 2. A Spearman's rank-order correlation or Spearman's rho statistical test was performed on all total subscale scores and sunscreen use both before practices and before games in order to address the second research question of whether a relationship exists between risk perception of skin cancer and sunscreen use. A significant positive Spearman's rho correlation was found for sunscreen use before practices with both the total perceived susceptibility subscale and the total perceived benefits subscale. Perceived susceptibility and perceived benefits accounted for a total of 14.8% of the variability in sunscreen use at practices. Sunscreen use before games had a significant positive correlation only with the total perceived benefits subscale score and accounted for 9.6% (r_s^2) of the variability in sunscreen use at games. The sample size of this study, 77, was adequate to provide 80% power to discover correlations between sunscreen use at practices and games and perceived susceptibility/perceived benefits which were statistically significant at the 2-tailed alpha level of .05. This study's correlations demonstrated a relationship between skin cancer risk perception and sunscreen use which was similar to several other studies. Heckman and Coups (2011), in their correlational study of sunscreen use among high school students, found a significant positive correlation ($r = .58, p < .001$) between perceived benefits of health preventive actions for skin cancer and sunscreen use. Berndt et al. (2011), in their social cognitive correlational study, were able to show that skin cancer risk perception had a significant positive correlation ($r = .68, p = .007$) with young adult sport competitors' sunscreen use. Branstrom, Kristjansson, and Ullen (2008) in their study on risk perception, optimistic bias, and readiness to change sun-

related behaviors found that an individual's perception of susceptibility to skin cancer changed sun-related protective behaviors including increased use of sunscreen.

Separate chi-square 2 x 2 analyses were performed for agreement/disagreement with each statement in each subscale and sunscreen use before practices and before games to further explore the relationship between risk perception of skin cancer and sunscreen use. A total of four items in three different subscales (susceptibility, severity and benefits) were found to have a significant relationship with sunscreen use before practices and/or before games. The statements (SU4, SU6), "I am concerned about getting skin cancer," and "I am afraid of getting skin cancer," both had a significant increased risk of not using sunscreen at practices and/or games if an athlete "disagreed" and had no perception of concern or fear of getting skin cancer. The item (SE6), "nobody dies from skin cancer," also had a significant increased risk of not using sunscreen at games if an athlete "agreed" and perceived that no one dies of skin cancer. The last significant item (BE2), "keeping my skin covered when I am outside is important to me," had a small decreased risk of not using sunscreen at games for those who did not believe in keeping their skin covered. All four of these statements significantly reflect the relationship between risk perception of skin cancer and sunscreen use. These statements would be clinically relevant and useful to ask in a skin screening or health-promotion-focused athlete interview and exam as they would help to identify and differentiate between those athletes that use and do not use sunscreen.

This study's significant associations demonstrated relationships between skin cancer risk perception and sunscreen use consistent with several other studies. Paul,

Tzelepis, Parfitt and Girgis (2008) found in their study on ways to improve sun protective behaviors in adolescents that concern about and fear of getting and dying from skin cancer were strong modifying factors in changing adolescents' sun protective behaviors including sunscreen use. Wysong et al. (2012) found in their study on NCAA collegiate athletes and barriers to sunscreen use that keeping skin covered or wearing athlete skins was one of several positive predictors of sunscreen use.

Research Question 3. Spearman rho and chi-square tests were used in the analysis related to the third research question of whether the relationship between risk perception of skin cancer and sunscreen use is influenced by specific athlete characteristics (age, school grade, race, family history of skin cancer, previous sunburns, and coach, parent, and teammate support of sunscreen use). A Spearman rho correlation was conducted on study covariates and sunscreen use before practices and games. Only parent and teammate encouragement of sunscreen use at games had significant positive correlations and accounted for a total of 17% of the variance in sunscreen use at games. These findings indicated that when parents and teammates encourage use of sunscreen before games, use increases. Chi-square analyses of demographic variables and covariates with sunscreen use at practices and games determined similar results to the Spearman rho correlations in that only parent and teammate encouragement of sunscreen use at games had statistically significant relationships. These two covariate athlete characteristics influence the relationship between risk perception of skin cancer and sunscreen use. Asking athletes questions about parental and teammate encouragement to use sunscreen

while playing their sport would be clinically important and beneficial in a focused athlete health promotion or skin screening interview/exam and would help to identify those athletes who may or may not be using sunscreen while playing their sport.

The findings of this study are consistent with those of a number of prior research studies that found that encouragement to use sunscreen for skin cancer prevention by parents and/or teammates heavily influenced and increased sunscreen use in adolescent and young adult athletes (Ellis, et al., 2012; Heckman & Coup, 2011; Fulmore, 2009; Paul et al., 2008). One study by Ellis et al. (2012) on sunscreen use in student athletes found that, in addition to parent and teammate encouragement to use sunscreen, coach encouragement was essential. Coaches, an extremely important and always present influence at both practices and games, were not found to encourage the population of athletes in the present study to use sunscreen. Coaches are very influential in these athletes' lives, and they are missing an opportunity to have a tremendous impact on present and future skin cancer prevention in this population.

Study Limitations

There were several limitations of this study that may prevent broad generalization of its findings. The sample size and ultimately the response rate, although relatively small, was calculated based on a power analysis and therefore was statistically strong enough to address the research questions. The sample population was only female, adolescent athletes who were limited to one geographic area (southern California), and playing the competitive club sport of soccer. Athletes who

participated in this survey study may have been more actively concerned about skin health and sun protection creating a possible sampling bias. Also, as with any survey-based study where data are self-reported, there is the potential for recall bias and socially desired responses which may affect sunscreen use and study results.

Implications of Findings for Nursing Practice and Education

The findings of this study suggest that adolescent female soccer athletes display considerable differences in overall perceptions of skin cancer risk and health preventive actions including sunscreen use.

The practice and education implications for club sport field nurses, school nurses, pediatric nurses, and primary health care nurses are to first understand that there are considerable differences in overall perceptions of skin cancer risk, several misconceptions, and variability in sunscreen use in this population. Understanding that adolescent female athletes have moderate perceptions of skin cancer severity and low perceptions of barriers to sunscreen use can be instrumental in educating this population on the need to use sunscreen regularly before practices and games.

Parents need to continue to encourage their adolescent athletes to apply and re-apply sunscreen before all practices and games. Coaches must be educated regarding the importance of sunscreen use, the need for their support in its use, and reminded of their influence over athletes' sun-protective behaviors. Players must also be instructed regarding the need to apply sunscreen and actively support their teammates in its use.

Nurses at all levels of health care can promote sun-protective education for athletes, parents, coaches, and the public in general. Primary care nurses are in an

excellent position to develop health education programs tailored to adolescents which should include sun-protective behaviors such as sunscreen use. As an example, members of this age group feel invincible and are very focused on their physical appearance. Educating them regarding the development of wrinkles at a younger age may well be an excellent way to elicit their attention. Sun-protective behaviors need to be taught and reinforced in age-appropriate, innovative ways. Smart phone applications, for example, which involve sunscreen application alarms or text message reminders, could be developed. Youth sport clubs are interested in and need policies addressing sun protective behaviors which club field nurses could develop and implement. Barriers to sunscreen use could be minimized, as an example, through field nurses incorporating into club policy the need to have sunscreen available on all practice and game fields. Sunscreen application before all practices and games should be required as part of a team's sport safety gear just as shin guards or other safety equipment is required to play the sport.

Future Research

Some recommendations for future research would be to replicate this study and include a wider age range of athletes, more racial groups with a larger sample of both adolescent males and females, and more than one competitive outdoor year-round sport. Inclusion of a broader range of age, gender, race, and sport would be of great interest and findings would be more generalizable. Another recommendation for future study would be to identify and confirm important correlates of adolescent sport competitors that promote sunscreen use. Identifying

these correlates would help improve sunscreen use and sun protective behaviors. One last recommendation would be to conduct a longitudinal, prospective, repeated-measures, cluster randomized control trial with at least four-year round adolescent competitive sports teams. The aim of the study would be to examine the between and within groups effect of a skin-cancer-preventive intervention, such as supplying sunscreen, on sunscreen use relative to three points in time (study start, two weeks after supplying sunscreen and six weeks later). Improving sunscreen use and sun protective knowledge through continued educational efforts to prevent skin cancer disease is essential for short-and long-term athlete health.

Summary

This chapter discussed four topic areas. Study findings were summarized and compared to previous research. The study's limitations as well as implications for nursing practice and education were explored. Finally, recommendations for future research were considered. The findings of this study highlight the need for greater education of adolescent athletes regarding their risk of skin cancer and for interventions to promote sunscreen use in this population.

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Appendix A

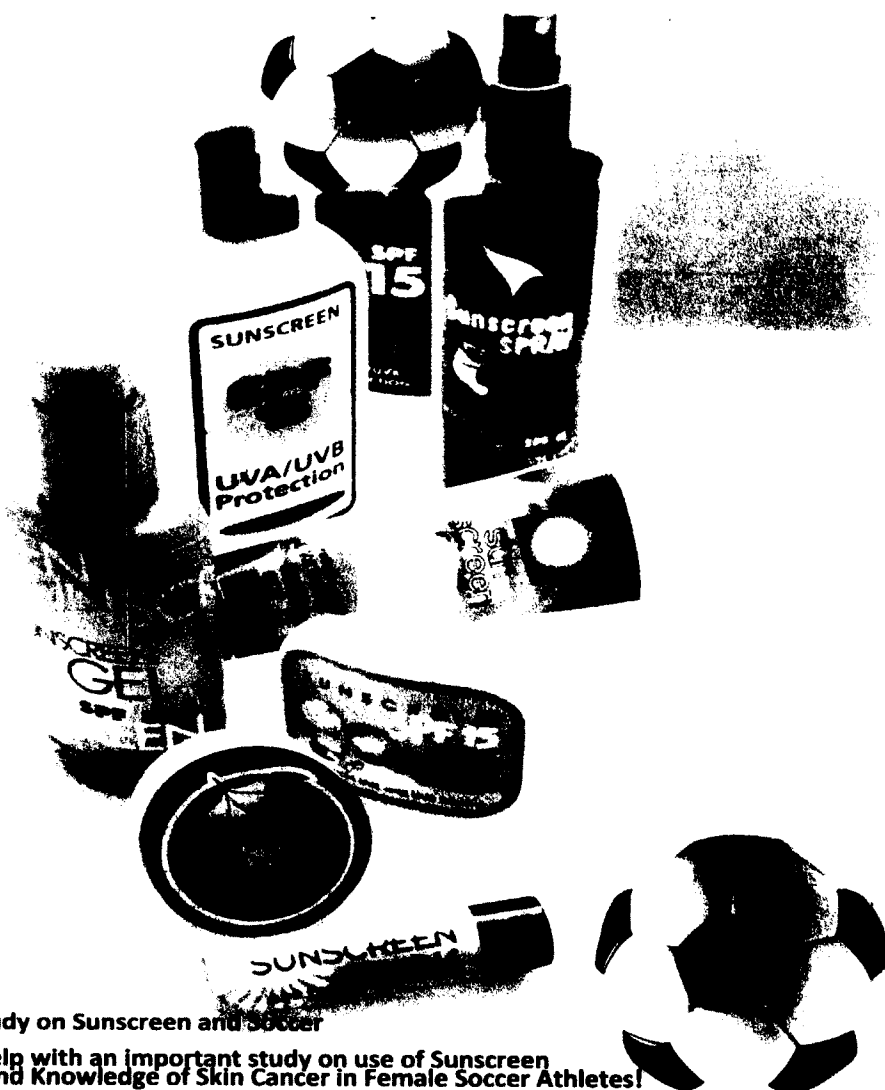
Soccer Girl Logo for Participant Cover Letter and Envelopes



Appendix B

Study Recruitment Flyer

Study on Sunscreen Soccer



S.O.S. – Study on Sunscreen and Soccer

**PLEASE help with an important study on use of Sunscreen
And Knowledge of Skin Cancer in Female Soccer Athletes!**

A survey questionnaire will be arriving at all GU 14 – GU 19 Team members homes in the next week. Please take a few minutes to fill out and return this questionnaire.

You will automatically be enrolled in a raffle for an **APPLE-mini 32 GB iPad!!**

If you have questions, please contact Cheryl Butera at (760) 815-0422 or cherylbutera@sandiego.edu

Appendix C

Adapted Shelestak and Lindow Instrument

HBM – Perceptions and Practices Regarding Skin Cancer Prevention ID _____

Please share your knowledge and beliefs about skin cancer and its prevention by placing an “X” in the box that is most true for you.

Statements:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SU1. My chances for getting skin cancer are high.					
SU2. My overall health makes it likely that I will get skin cancer.					
SU3. My lifestyle increases my chances of getting skin cancer.					
SU4. I am concerned about getting skin cancer.					
SU5. I believe I will get skin cancer in the next 5 years.					
SU6. I am afraid of getting skin cancer.					
SU7. People with dark skin don't have to worry about skin cancer.					
SU8. Only older people get skin cancer.					
SE1. Skin cancer is much more serious than other types of cancer.					
SE2. Skin cancer is very expensive to treat.					
SE3. There is a strong possibility that I could die from skin cancer.					
SE4. My soccer would be affected if I got skin cancer.					
SE5. Skin cancer is easily cured.					
SE6. Nobody dies from skin cancer.					
SE7. Checking my skin isn't as important as checking my blood pressure.					
BA1. Sunscreens are too expensive for me to buy.					
BA2. Checking my skin takes too long					
BA3. Checking my skin regularly won't prevent me from getting skin cancer.					
BA4. I don't know what to look for when checking my skin.					
BA5. It would be easier to check my skin if someone helped me.					
BA6. It's too expensive to have a healthcare provider check my skin.					

Please share your knowledge and beliefs about skin cancer and its prevention by placing an "X" in the box that is most true for you.

Statements:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
BE1. I should limit my time outside when the sun is strongest.					
BE2. Keeping my skin covered when I am outside is important to me.					
BE3. I should always apply sunscreen before going outside during the day.					
BE4. Doing a thorough skin exam every month is important for me to do					
SS1. I apply sunscreen before all soccer practices.					
SS2. I apply sunscreen before all soccer games.					
CO1. A member of my family has had skin cancer.					
CO2. I have had at least 1 blistering sunburn i my life.					
CO3. My parent(s) has always encouraged me to use sunscreen when playing soccer.					
CO4. My coach has always encouraged me to use sunscreen when playing soccer.					
CO5. My teammates always encourage me to use sunscreen when playing soccer.					

Please share some information about yourself by placing an "X" on the appropriate line.

1. <u>What is your age?</u>	2. <u>What is your grade level?</u>	3. <u>How do you describe yourself?</u>
_____ 13 years	_____ Grade 6	_____ Asian or Pacific Islander
_____ 14 years	_____ Grade 7	_____ Black or African American
_____ 15 years	_____ Grade 8	_____ Hispanic, Latino or Mexican
_____ 16 years	_____ Grade 9	_____ Native American/American Indian
_____ 17 years	_____ Grade 10	_____ White or Caucasian
_____ 18 years	_____ Grade 11	_____ Multi-racial
	_____ Grade 12	_____ other (Please specify) _____

Appendix D

Permission for use of Study Instrument

Request permission to use, your Instrument measuring beliefs-HBM-for Skin Cancer study?

4:16 AM

To: Cheryl Butera

From: **SHELESTAK, DEBRA** (dshelest@kent.edu)
Sent: Fri 5/03/13 4:16 AM
To: Cheryl Butera (cherylbutera@sandiego.edu)

Absolutely. Your study sounds very interesting and certainly pertinent. Please let me know if there is any way I can help and good luck with your study. I am interested in reading your results. Deb

Deb Shelestak, PhD, RN
Olga A Mural Assistant Professor, Nursing
Coordinator, BSN program at Stark
Kent State University, Stark Campus
6000 Frank Ave NW
North Canton, OH 44720
330-244-3385
dshelest@kent.edu

From: Cheryl Butera [cherylbutera@sandiego.edu]
Sent: Wednesday, May 01, 2013 8:31 PM
To: SHELESTAK, DEBRA
Subject: Request permission to use, your Instrument measuring beliefs-HBM-for Skin Cancer study?

Dr. Deb Shelestak, I am writing this email to request permission from you to use your Instrument which measures beliefs regarding skin cancer based on the Health Belief Model. This instrument was discussed and published in your May/June 2011 article, Beliefs and Practices Regarding Skin Cancer Prevention in the *Journal of the Dermatology Nurse's Association*. I am a practicing Family Nurse Practitioner and a PhD in nursing graduate student at the University of San Diego in San Diego, California. My proposed study relates to adolescent female athletes and their perceived risk of skin cancer and correlated sunscreen use. My conceptual model is the Health Belief Model. Your well-constructed and validated Instrument would enhance my study and help measure the constructs I am attempting to evaluate. May I please have your permission to use it in my study?

Thank you very much-

Sincerely,

Cheryl L. Butera

Cheryl L. Butera MSN, APRN, FNP-BC, PHN (PhD in nursing graduate student)
University of San Diego
Hahn School of Nursing and Health Sciences
5998 Alcalá Park, San Diego, CA. 92110

Appendix E

Cover Letter to Parent/Guardian

Dear Parent or Guardian,

You and your child are being asked to be a part of a survey that looks at how adolescent female club soccer athletes perceive their risk of developing skin cancer and how this might affect their use of sunscreen. This research study is being conducted by Cheryl Butera MSN, Family Nurse Practitioner and registered nurse, as part of her doctoral dissertation at the University of San Diego, School of Nursing and Health Science. Cheryl is a nurse practitioner who would like to find out how nurses can help educate adolescent soccer athletes to better protect themselves from sun damage to their skin.

This study is not being sponsored by the San Diego Surf Soccer Club. You and your child do not have to participate if you don't want to. Choosing to participate or not participate in this study will have no effect on your child's athletic standing with or membership in the Surf Soccer Club. Participating takes about 10 minutes of your time and 15 minutes of your child's time to fill out the forms. There is a pre-stamped addressed envelope to put the forms in and return them to Cheryl. If you are not interested, you can just dispose of these materials in the trash.

If you think you might be interested, please read the form called "Parent/Guardian Consent." It will tell you the details about the study. If you'd like to know more about the study, you can call Cheryl at 760-815-0422 or e-mail her at cherylbutera@sandiego.edu. You may also call her dissertation chairperson, Dr. Mary Jo Clark, PhD, RN at 619-260-4574 or email her at clark@sandiego.edu.

Your time and consideration are appreciated very much.

Sincerely,

Cheryl Butera MSN, RNNP

Appendix F**Parent/Guardian Consent Form****University of San Diego****Institutional Review Board****Research Participant Consent Form**

For the research study entitled: ID_____

Skin cancer risk perception and sunscreen use in adolescent female soccer athletes

I. Purpose of the research study

Cheryl Butera is a student in the PhD in nursing program at the University of San Diego. Your adolescent soccer athlete daughter is invited to participate in a research study she is conducting. The purpose of this research study is: to obtain knowledge about skin cancer beliefs and sunscreen use in the adolescent female soccer athlete.

II. What you will be asked to do

If you decide your daughter may be involved in this study, she will be asked to:

1. Read and sign a youth assent/consent form stating that she understands what the study is about and that she has chosen to participate in the study.
2. Answer 40 questions about her knowledge and beliefs regarding skin cancer and sunscreen use as well as three questions regarding her age, grade in school, and race/ethnicity.
3. The survey questionnaire will be completed in her home residence and mailed back.
4. All information collected for this study is confidential. All study information will be coded with individual identification numbers which will be used in place of names.
5. There will be no cost to your daughter except for her time in completing the survey.

Your daughter's participation in this study will take a total of approximately 15 minutes.

III. Foreseeable risks or discomforts

The questionnaire asks your daughter questions about skin cancer. Sometimes when people think about health issues, they feel sad or anxious. **If you or your daughter would like to talk to someone about these feelings, please call toll-free, 24 hours a day: San Diego Mental Health Hotline at 1-800-479-3339.**

IV. Benefits

While there may be no direct benefit to your daughter from participating in this study, the indirect benefit of participating will be knowing that she helped researchers better understand what kind of knowledge and beliefs adolescent female soccer athletes have regarding skin cancer and how this may affect their use of sunscreen as a protective behavior.

V. Confidentiality

Any information provided and/or identifying records will remain confidential and kept in a locked file and/or password-protected computer file in the researcher's office for a minimum of five years. All data collected from your daughter will be coded with a number. Her real name will not be used. The results of this research project may be made public and information quoted in professional journals and meetings, but information from this study will only be reported as a group, and not individually.

VI. Compensation

If your daughter participates in this study, she will have the opportunity to win an **APPLE – iPad mini Wi-Fi 32 GB** by simply including in the stamped addressed return envelope her survey, parent consent, and youth assent along with her individually number coded raffle ticket which was included in the original envelope with the survey. Your daughter's chances of winning the **APPLE – iPad mini Wi-Fi 32 GB** are about 1 in 135, since we anticipate that about 135 adolescent female soccer athletes will fill out the questionnaire.

VII. Voluntary Nature of this Research

Participation in this study is entirely voluntary. You do not have to do this, and your daughter can refuse to answer any question or quit at any time. Deciding not to participate or not answering any of the questions will have no effect on any benefits you're entitled to, like your health care, or your athletic events or grades. **Your daughter can withdraw from this study at any time without penalty.**

VIII. Contact Information

If you have any questions about this research, you may contact either:

1) Cheryl Butera

Email: cherylbutera@sandiego.edu

Phone: 760-815-0422

2) Mary Jo Clark PhD, RN, PHN, Committee Chairperson Dissertation Committee

Email: clark@sandiego.edu

Phone: 619-260-4574

I have read and understand this form, and consent to the participation of my daughter in the research it describes to me. I have received a copy of this consent form for my records.

Signature of Parent/Guardian

Date

Name of Parent/Guardian (**Printed**)

Signature of Investigator

Date

Appendix G

Assent Form for Adolescents

ID _____

My name is Cheryl Butera. I am a registered nurse and nurse practitioner. I am doing a special project at my university, the University of San Diego. This project is a research study. A research study means new ideas and things are being studied. I want to find out how much teenage girls who are soccer athletes know about using sunscreen to prevent skin cancer. You can be in my study if you choose to be, but you do not have to. If you decide you want to be in my study, you will tell me how much you agree or disagree with some statements about skin cancer by checking your answer on a paper questionnaire.

I will ask you to please read and fill out the questionnaire that is included in the same envelope as this form. You can do this in your own home and at whatever time is good for you. It will take about 15 minutes.

Sometimes teenagers feel a little tired when they answer questions on a paper. You can stop anytime to take a break, or decide not to do it anymore. This survey asks questions about skin cancer. Sometimes when people think about health issues, they feel sad or anxious. **Be sure to tell your parent or guardian if you feel that way. If you would like to talk to someone about these feelings, please call toll-free, 24 hours a day: San Diego Mental Health Hotline at 1-800-479-3339.**

Whether you choose to participate in my study or not, I will enter you in a raffle for a **White, Apple – iPad mini Wi-Fi 32 GB**. You would just need to keep one copy of the raffle ticket that came in the envelope with this form and return the other copy of the raffle ticket with your questionnaire, parental consent and adolescent assent in the included stamped addressed envelope. Your chances of winning the **White, Apple – iPad mini Wi-Fi 32 GB** are about 1 in 135, since we anticipate that about 135 adolescent female soccer athletes will fill out the questionnaire.

All of your answers will be confidential, that is, secret. Your name will not be on the paper questionnaire. I will share my findings with other nurses and doctors, but no names will be used.

Your parent or guardian will also need to sign a permission slip or consent for you to be included in my study if you are under 18 years of age. Remember, it is up to you if you want to be in my study. If you decide not to participate or mark any of the statements, this will have no effect on your health care, grades or your soccer athletic activities.

My telephone number is (760) 815-0422. Please feel free to call me if you have questions about the study or being involved with the study. You or your parents can also call my university professor, Dr. Mary Jo Clark, at the University of San Diego, (619) 260-4574 in order to ask questions.

I have included two copies of this permission slip, one for you to keep and one for you to sign and return to me with your raffle ticket, signed parent consent and questionnaire.

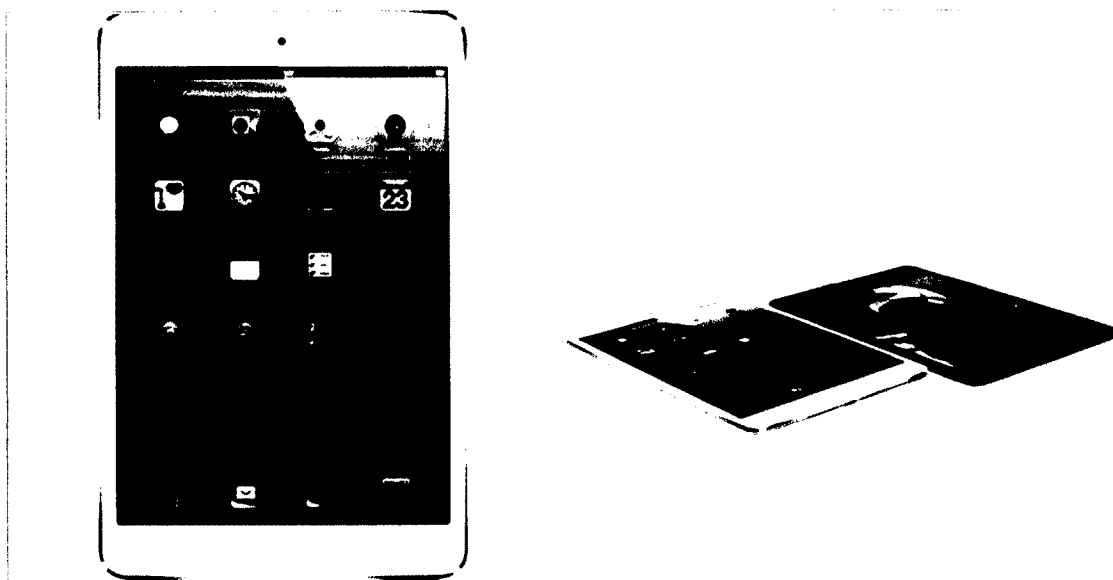
I have read and understand this form and consent to the research it describes to me.

Name: _____ Date: _____
 Researcher: _____ Date: _____

Appendix H

Study Participation Incentive

APPLE – iPad mini Wi-Fi - 32GB



Apple® - iPad® mini Wi-Fi - 32GB - White



Appendix I

Reminder Postcards

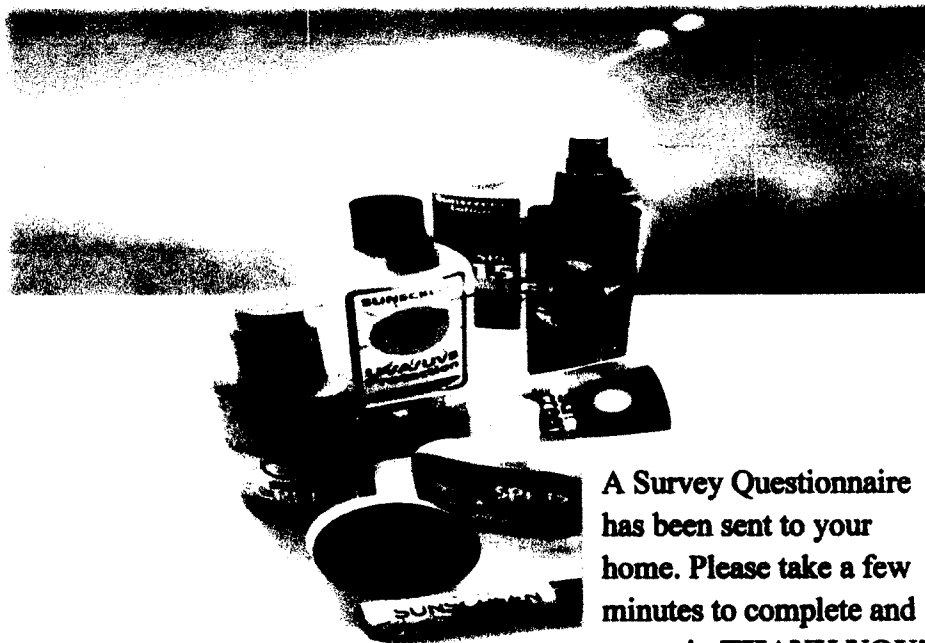
University of San Diego

5998 Alcala Park

San Diego, CA. 92110

Reminder - Please participate in a study on Soccer & Sunscreen Use!

You will be entered into a Raffle to Win an **APPLE- iPad Mini 32 GB**



A Survey Questionnaire
has been sent to your
home. Please take a few
minutes to complete and
return it. **THANK YOU!**

Certificate of Completion

of the **Survey of Earned Doctorates Questionnaire**

**This certifies that Cheryl Butera, a student
at
Univ. of San Diego,
has completed the
Survey of Earned Doctorates
on 9/18/2014**



Print

If required you may print this certificate (press Ctrl-P) and present it to your graduate school to show completion of the Survey of Earned Doctorates.

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[Save & Exit](#)