Sun Prevention Fun (SPF): a Multicomponent Sun Prevention Program for Children in Kindergarten and First Grade

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SUN PREVENTION FUN (SPF): A MULTICOMPONENT SUN PREVENTION PROGRAM FOR CHILDREN IN KINDERGARTEN AND FIRST GRADE

by

SARAH GOUKER

EVIDENCE-BASED PRACTICE PROJECT REPORT

Submitted to the College of Nursing and Health Professions of Valparaiso University, Valparaiso, Indiana in partial fulfillment of the requirements for the degree of

DOCTOR OF NURSING PRACTICE

2018
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DEDICATION

This project is dedicated to the most incredible family that any girl could ask for. To my grandparents, William and Mary Roberts: thank you for always supporting me both emotionally and financially during my college career. You have always been the calming voice of reason that is only a telephone call away. I will be blessed if I can someday give my future grandchildren half of what you have given me. To my mother, Elisa Gouker: thank you for raising me to be a young woman who not only dreams but strives for perfection in every aspect of my life. You are strong, courageous, and I am proud to be your daughter. To my sister, Emily Gouker: thank you for always being my best friend. God knew that I needed a sister like you. Lastly, to my late father, John Gouker: even though you cannot be here today, I know that you are smiling down on me from heaven. Every day of my life I strive to continue to make you proud. I love you all so much and I know that I could not have completed this doctoral degree without all of you.
ACKNOWLEDGMENTS

This project would not have been possible without the guidance from many talented advisors and mentors. My project advisor, Dr. Lynette Rayman, not only provided me with the feedback and support that was necessary to complete the project, but she always had a smile on her face. Her flexibility, kindness, and compassion for teaching students are infectious. Diane Wirth, the facility advisor of this project and the principal of the elementary school, continued to advocate for my project and support both the teachers and students during the implementation phase. Her support and guidance during the project resulted in the project being a success. However, the project would not have been possible without the cooperation of the teachers and students at the elementary school. With deepest gratitude, I thank all of you for allowing me to take over the classroom for one week. Lastly, I would like to thank my partner in crime, Tom Geairn, for not only proofreading my entire paper, but for keeping me sane. You always make me smile, laugh, and remind me that, “everything is going to be okay.”
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ABSTRACT

Skin cancer is an important topic in the United States due to the recent increase in cost and mortality. The purpose of this evidence-based practice (EBP) project was to determine if the early implementation of a multicomponent sun prevention program positively impacted kindergarten and first grade students’ knowledge and behavioral intentions to practice safe sun techniques after a one week period. Kotter’s Model of Change and the ACE Star model were utilized to guide this EBP project. An exhaustive review of the literature yielded 12 articles which were used to develop best practices for education on sun safety. The quality of the evidence was evaluated using the Critical Appraisal Skills Programme (CASP) tool. Kindergarten and first grade students of a public Midwestern elementary school were invited to participate. The project leader obtained IRB approval and parental consent, collected demographics, and created an original sun prevention program using child-friendly strategies. The sun prevention program was implemented thirty minutes per day for four days. The program interventions included the educational themes: safari time, take a splash, block party, and Ray’s future. An original tool that measured the students’ knowledge and behavioral intentions was utilized to evaluate project success. Outcomes were measured using a paired t-test and compared the pre-test and post-test results. The four day multicomponent sun prevention program for students in kindergarten and first grade was significant for the pre-test to post-test knowledge results (t(1) = -9.567, p<0.001), the pre-test to post-test behavior results (t(3) = -7.915, p<0.001), and the pre-test to post-test total knowledge/behavior results (t(5) = -12.011, p<0.001). This EBP project can be used to establish a school corporation-wide policy for an annual sun prevention program.
CHAPTER 1
INTRODUCTION

Background

Skin cancer is the most commonly diagnosed and preventable disease in the United States (U.S. Department of Health and Human Services (HHS), 2014). Annually, around five million people are treated for skin cancer at a cost of an estimated $8.1 billion (HHS, 2014). Skin cancer may disfigure the outward appearance of the skin, and tends to decrease a person’s quality of life. According to the HHS (2014), thousands of people lose their lives to skin cancer each year.

The three main types of skin cancers include: basal cell carcinoma, squamous cell carcinoma, and melanoma. The incidence of all three skin cancer types have been on the rise for the past 30 years (Watson et al., 2015). “Rates of skin cancer have tripled since the early 1970s” (Watson et al., 2015). Researchers from the American Cancer Society (ACS) (2017) attribute the increase of skin cancer incidence to a combination of better skin cancer detection, an increase in sun exposure, and an increase in life expectancy. If treated early, basal and squamous cell carcinoma are highly curable; although an estimated 2,000 people die annually from basal and squamous cell carcinoma (ACS, 2017).

In contrast, melanoma is associated with higher rates of morbidity and mortality (ACS, 2017). According to the Centers for Disease Control and Prevention (CDC) (2016), 71,943 people in the United States were diagnosed with melanomas of the skin in 2013 and of those diagnosed, 9,394 people died. The lifetime risk of getting melanoma is about 1 in 40 for Caucasians, 1 in 1,000 for African Americans, and 1 in 200 for Hispanics (ACS, 2017).

The most common risk factors for the development of melanoma include: ultraviolet (UV) light exposure (natural and artificial), the presence of moles, fair skin, freckling of the skin, light hair, family history of melanoma, personal history of melanoma, a weakened immune
system, older age, male gender, and xeroderma pigmentosum (XP) (ACS, 2017). XP is an inherited condition which is characterized by an extreme sensitivity to sun exposure and children often burn within a few minutes of exposure to the sun (U.S. National Library of Medicine, 2017). If a child with XP is overexposed to the sun, then it is likely that the child will develop skin cancer by age 10 (U.S. National Library of Medicine, 2017).

**Statement of the Problem**

Melanoma affects not only the elderly population, but young children as well. The National Cancer Institute estimates that around 500 children (under the age of 20) are diagnosed with melanoma annually (Melanoma Research Foundation, 2017). The overall incidence of pediatric melanoma increases 2.9% per year in children and adolescents (Davis et al., 2014). Many researchers attribute this increase to the overexposure to ultraviolet rays (UVR), via natural or artificial sources (Maguire-Eisen, 2013). A surprising 25% of lifetime UVR exposure occurs during childhood in children ages zero to fourteen (Maguire-Eisen, 2013).

The indoor tanning industry continues to thrive as a multi-billion dollar business with an estimated one million Americans tanning daily (Maguire-Eisen, 2013). Many people assume that tan/brown skin is “healthy skin.” In 2009, the World Health Organization (WHO) added tanning beds to the “highest cancer risk” category (Maguire-Eisen, 2013). Thus, tanning beds are now categorized with other carcinogens such as cigarettes and asbestos. It is no surprise that since 2003, many states have implemented tanning bans for individuals under the age of 18 (Maguire-Eisen, 2013). According to the National Conference of State Legislatures (NCSL) (2017), 44 states and the District of Columbia regulate indoor tanning for minors. Those states which completely forbid tanning under the age of 18 include: California, Delaware, Hawaii, Illinois, Kansas, Louisiana, Massachusetts, Minnesota, Nevada, New Hampshire, North Carolina, Oklahoma, Oregon, Texas, Vermont and Washington (NCSL, 2017). Not only have some states banned underage tanning, but many states are also increasing the tax on tanning services.
Reducing indoor tanning will not only reduce the incidence of skin cancer and save our country millions of dollars; it will also save lives (Maguire-Eisen, 2013).

Natural UVR exposure is also increasing in children. Natural UVRs are more commonly seen in states where the UVR index is higher (such in the Southern states), and the climate is more susceptible to more UVRs due to geographical location. Outdoor UV levels are measured daily on a spectrum from zero (minimum) to greater than eleven (maximum) (HHS, 2014). The UV levels are calculated “on the basis of the angle of the sun, ozone levels, expected cloud cover, and other local conditions” (HHS, 2014, p. 77). Depending on the severity of the UV level, an individual’s epidermis, dermis, and subcutaneous tissue may be damaged (HHS, 2014). For example, if the UV level is ranging from nine to eleven, it is possible that all three levels of the skin tissue may be damaged (HHS, 2014). “Multiple studies show that half of all American children experience summer sunburns” (Maguire-Eisen, 2013). Factors attributing to these sunburns may include: increasing age, fair skin, time spent outdoors, inconsistent sunscreen application, inadequate protective clothing, inadequate shade, and inadequate knowledge of children/parent regarding sunburn protection (Maguire-Eisen, 2013; Watson et al., 2015).

In 2008, the CDC acknowledged the need to prevent the sunburn factors mentioned above and published, “Shade Planning for America’s Schools.” This guideline called on the help of students, teachers, staff, and parents. The guideline recognized that education regarding sun protection must start when the child enters kindergarten. The goal of the guideline was to develop a comprehensive approach which provided educators with tools to initiate primary prevention and reduce the incidence of skin cancer (CDC, 2008). Many states have considered initiating policies but only a few have followed through.

Despite multiple efforts from national guideline committees and national health organizations such as the CDC and the WHO, the incidence of skin cancer has not decreased. UVR can cause damage to your skin in as little as 15 minutes (CDC, 2017). Unfortunately, only one-third of America’s youth, children age zero to nineteen, practice skin protection
interventions regularly (CDC, 2017). Therefore, primary prevention regarding skin protection in children is lacking. Children are a vulnerable population who rely heavily on the people around them for the best care. Together, with the help of the family, educators have the opportunity to decrease the incidence of skin cancer. Information regarding the data from the literature and from the clinical agency will explain the immediacy of the problem.

Data from the Literature Supporting Need for the Project

The urgency of skin protection interventions came to light in 2014 when the Surgeon General partnered with the U.S. Department of Health and Human Services (HHS) to create, “The Surgeon General’s Call to Action to Prevent Skin Cancer”. The Surgeon General acknowledged that skin cancer is an epidemic currently affecting our country (HHS, 2014). The Surgeon General highlighted the importance of initiating prevention policies in schools. According to the CDC’s School Health Policies and Practices Study (SHPPS) (2012): 44.4% of school districts allow students to apply sunscreen while at school, 36.1% encourage students to wear hats or visors, 39.6% encourage students to wear protective clothing such as long-sleeved shirts or long pants, 25.1% of students are encouraged to wear sun glasses when outside, and 38.3% of outdoor activities are scheduled to avoid times when the sun is at peak intensity during the school day. These current practices of American school systems are significant, and highlight the need for school-based sun prevention programs.

In 2002, the CDC established skin cancer prevention guidelines for school-aged students. These guidelines include: (1) initiation of a school-based policy, (2) environmental changes, (3) education, (4) family involvement, (5) professional development, (6) health services, and (7) evaluation (Glanz, Saraiya, & Wechsler, 2002). The guidelines suggest that in order to establish a long-term intervention, a policy regarding sun prevention must be established (Glanz et al., 2002).

The success of a sun prevention policy requires cooperation and commitment from all parties. It is essential to note that in a school this process may be difficult because of the
number of individuals responsible for ensuring that the policy is a success. Environmental changes may include the need to create more shade by the playground for recess (Glanz et al., 2002). In addition, the school may choose whether to have recess indoors or outside after the school gauges the UV index spectrum (Glanz et al., 2002). Next, the CDC recognizes that children learn best when the information is presented in a fun, interesting, participatory manner (Glanz et al., 2002). Once the information is learned, the family must be involved in order to reinforce the information. Educators must work with local health services so that parents can be given choices regarding the child’s health (Glanz et al., 2002). For example, sunscreen may be applied to the child before outdoor activities if the parent and educators advocate for the change. Lastly, the evaluation of the policy will help other school corporations identify the benefits of a sun prevention program (Glanz et al., 2002). Sun prevention policies may not yield immediately observable benefits; however, the policies are designed to encourage children to avoid overexposure as they become teenagers and young adults.

**Data from the Clinical Agency Supporting Need for the Project**

The agency chosen for the implementation of the project is a public elementary school, located in Granger, Indiana. The area is well-developed and includes a combination of many expensive shopping centers and restaurants. The average family that resides in this location is upper-middle class to upper class citizens. The children involved in the EBP project were in kindergarten and the first grade. According to the Indiana Department of Education (IDOE) (2016) during the school year (2016-2017) the demographics included: 69.5% Caucasian, 20.6% Asian, 3.9% Multi-racial, 3.4% Hispanic, and 2.4% African American. An indicator of socioeconomic status among the community is the percentage of children who receive free and reduced lunch. For the school year (2016-2017) the results were: 94.4% paid meals, 2.4% free meals, and 2.2% reduced meals (IDOE, 2016). In 2016, the school was nationally recognized as a National Blue Ribbon School and received four stars for their academic excellence (PHM,
2016). The school was ranked 27 (out of 70,000) in the 2016 list of “50 Best American Public Elementary Schools” (PHM, 2016).

The systematic review titled, “Skin Cancer: Child Care Center-Based Interventions” is published under “The Guide to Community Preventative Services” (The Task Force), which is a nationally recognized collection of EBP findings. The systematic review suggests that sun prevention programs for children from newborn to nineteen years old will improve sunscreen use, hat use, protective clothing use, use of shade while outdoors, and sunburn incidence (The Task Force, 2013). The Surgeon General agreed with these findings and insisted that communities implement sun prevention programs in local schools, daycares, and other child-care facilities (HHS, 2014). It is predicted that the sooner children are educated about sun prevention opportunities; the fewer incidences of skin cancer will occur (HHS, 2014).

**Purpose of the Evidence-Based Practice Project**

It is clear from the current evidence that there is a lack of sun prevention education in school systems across the United States. Many children do not wear protective clothing, and suffer from UVR burns. This behavior then creates potentially fatal outcomes later in life. Therefore, the purpose of this EBP project was to implement a multicomponent sun prevention program for children in kindergarten and the first grade. By targeting children with this information early in their education, it allowed for more opportunities to reinforce the information. Behaviors often learned, thus a positive image of skin care should be displayed early in life.

The EBP project titled, Sun Prevention Fun (SPF) with Ray, examined the effects of a multicomponent sun prevention program on the knowledge, and future intentions to practice sun prevention of elementary school students. The compelling clinical question which initiated this EBP project was: What is the effect of sun prevention education on children’s knowledge and intended future behaviors related to sun protection and skin cancer prevention?

The PICOT (i.e., patient population, intervention of interest, comparison intervention or status, outcome, and timeframe) format was used as the foundation for the EBP project. The
PICOT helped guide the EBP project and enabled the ability to retrieve the best, most current evidence. The following PICOT question was developed: For children in kindergarten and the first grade, does the early implementation of a multicomponent sun prevention program positively impact the children's knowledge and behavioral intentions to practice safe sun techniques, as compared to the knowledge and behavior of the children prior to the sun prevention program after a one week period? The aims of the project were to increase the children's knowledge and improve the use of sun prevention behavior.

**Significance of the EBP Project**

For thirty years, skin cancer has been on the rise. Since the 1970s, the rates of skin cancer have tripled (Watson et al., 2015). Since 2002, when the CDC recognized that the United States was in need of a sun protection intervention, many programs have been established in an attempt to decrease skin cancer incidence. However, few school corporations have committed to implementing these programs long-term. On the contrary, one state that did recognize the urgency of the skin cancer epidemic was Arizona. The SunWise program is required by Arizona state law to be incorporated into the school education curriculum for public school children in kindergarten through 8th grade (Watson et al., 2015). Education regarding UVR protection can help children develop the skills, knowledge, and behavioral changes that correlate with positive sun prevention.

The Surgeon General called on the citizens of the United States for help preventing skin cancer through the implementation of these five strategies: “(1) increase opportunities for sun protection in outdoor settings, (2) provide individuals with the information they need to make informed healthy decisions about UV exposure, (3) promote policies that advance the national goal of preventing skin cancer, (4) reduce harm from indoor tanning, and (5) strengthen research, surveillance, monitoring, and evaluation related to skin cancer prevention” (Watson et al., 2015, p. 1312-1313). The most current evidence suggests that implementation of communitywide programs in the United States will not only save the country $2.7 billion in newly
diagnosed melanoma cases, but will annually avert an estimated 230,000 cases of melanoma (Watson et al., 2015). Even though the project was aimed at educating children, the project may also positively impact the administrators, teachers, and parents. Results from the EBP project may then be applied by additional advanced practice nurses (APNs) to facilitate future school-based interventions aimed at preventing skin cancer.
CHAPTER 2
THEORETICAL FRAMEWORK, EBP MODEL, AND REVIEW OF LITERATURE

Theoretical Framework

An EBP project builds on the research of other clinicians. This project utilized John Kotter’s Change model, the Academic for Evidenced-based Practice (ACE) Star model and an extensive review of the literature. This chapter will outline the Kotter Change process and the ACE Star model and discuss how these frameworks assisted with the implementation of the project. In addition, the literature review process is explained and an appraisal of the articles chosen for inclusion is presented in an evidence table.

Overview of Theoretical Framework

Kotter’s Change model was the theoretical framework that helped guide this EBP project. John P. Kotter, author of the book, “Leading Change” (1996), recognized that even though many people can recognize the need for a change, few people are interested in enforcing it. Change is often, “very, very tough,” but in order for an organization to thrive, change is often necessary (Kotter, 1996, p. 35). Therefore, John Kotter established the eight stages of change: (1) establishing a sense of urgency, (2) creating the guiding coalition, (3) developing a vision and strategy, (4) communicating the change vision, (5) empowering employees for broad-based action, (6) generating short-term wins, (7) consolidating gains and producing more change, and (8) anchoring new approaches in the culture (Kotter, 1996).

The first step of the Kotter Change model establishes a sense of urgency. Kotter (1996) recognized that urgency is often created when there is a sense of uncertainty or complacency within an organization. For example, when a large company is in competition with other companies they will try to increase their sales so they are in the financial lead. However, if the other company is in the lead, then changes may be considered. Sources of complacency include: the absence of a major visible crisis, too many visible resources, low overall
performance standards, organizational structures that focus employees on narrow functional goals, internal measurement systems that focus on the wrong performance indexes, human nature, and too much happy talk from senior management (Kotter, 1996). Step one- creating urgency, must be enhanced. Ways to raise the urgency level include: creating a crisis, set targets high, hold people accountable, send information regarding customer satisfaction to employees, create open, honest discussion, and include information regarding positive future opportunities (Kotter, 1996). If these strategies are properly implemented, then urgency is established.

When change is initiated, there is often one leader who guides the group (Kotter, 1996). However, the leader needs other team members who will help achieve the goal. Step two of Kotter’s model states, “A strong guiding coalition is always needed- one with the right composition, level of trust, and shared objective” (Kotter, 1996, p. 52). In order to create a coalition, position power, expertise, credibility, and leadership must exist within the group. Then, the powerful team can work on step three- creating the necessary vision, communicating the vision, and empowering others to accept the vision.

Step three, establishes a vision which is often equated to a picture of the future (Kotter, 1996). A vision clarifies direction, motivates people to take action, and helps coordinate the actions of different people. Kotter (1996) explained that a vision can be either simple or complex in nature. Regardless, establishing a clear vision requires a transformation and may improve the effectiveness of current practices. The process is rigorous and cannot be done without a strong team (Kotter, 1996).

Step four of Kotter’s Change model communicates the vision change. Managers tend to under-communicate when a vision for change is required (Kotter, 1996). Workers may not be trained properly to understand or implement the change. Thus, any change is a process that requires adequate communication. One of the roles of the guiding coalition is to help others better understand the vision for change. Strategies such as, keeping it simple, using examples
and forums, repeating the vision, and leading the example, may increase the communication effectiveness (Kotter, 1996).

Step five is empowering employees for broad-based action. In order to empower employees, structural barriers must be removed (Kotter, 1996). Employees may want to support the change, but are only able to do so if resources are properly organized. Employees must also be trained to initiate the change into practice. Training others allows for an increase in support from the company as a whole and moves the change process forward. Overall, empowering people to implement change includes the need to: communicate a sensible vision to employees, make structures compatible with the vision, provide training employees need, align information and personnel systems to the vision, and confront supervisors who undercut needed change (Kotter, 1996).

Kotter’s sixth step explains that all wins should be acknowledged and celebrated when a vision change is at stake (Kotter, 1996). Short-term wins are often useful because they allow other team members to see that the transformation is moving forward (Kotter, 1996). Employees may assume that the change is “never going to happen.” However, the short-term win is an example of the positive vision change. The roles of the short-term win are: provide evidence that sacrifices are worth it, reward change agents with a pat on the back, help fine-tune vision and strategies, undermine cynics and self-serving resisters, keep bosses on board, and build momentum (Kotter, 1996).

Kotter’s seventh step is to consolidate gains and produce more change. Interdependence may result in halting the change (Kotter, 1996). If the change is stopped then it is the coalition’s responsibility to gain support and momentum of the team members. Within an organization, there may be a multitude of change interventions taking place. Therefore, Kotter (1996) insists that interdependences must be reduced. The change process may be a long road, so successful change efforts should include: more change, not less, more help, leadership
from senior management, project management and leadership from below, and reduction of unnecessary interdependencies.

The eighth and final step of Kotter’s Change model is to anchor new approaches in the culture. Kotter (1996) suggests that culture change comes first, not last. Many times an organizational change may not fit within the culture of the company. It is the responsibility of the company to adjust the current culture to fit the new change. It is possible that this culture may be difficult for many individuals, especially the senior leadership. According to Kotter (1996), change is essential and must be anchored into the culture in order to be a success.

**Application of Theoretical Framework to EBP Project**

For the EBP project, a sense of urgency was established by assessing the current statistics that surround the incidence of skin cancer in the United States. Young children are now at the highest risk of obtaining sunburns which will affect their risk of obtaining skin cancer later in their lives. In order to share this sense of urgency, the principal and teachers of the elementary school were educated on the topic and agreed on the importance of the sun prevention program for children in kindergarten and the first grade. After urgency was established, it was evident that the guiding coalition of this project included the project leader, the principal, the teachers, the parents, the students, and the project advisor. Together, the team will guide the students through the sun prevention program. The guiding coalition worked together in order to create a common goal.

While creating the EBP project, the vision and the strategies of the program were primarily created by the project leader. However, the other members of the guiding coalition were also included in the team and their vision and opinions were considered. The entire team was well educated on the purpose of the program and the positive changes that correlate with the program. The vision change was communicated to the team members verbally and through the parental consent and the brochure which was provided to the parents. In addition, a visual aid was used to increase communication. Parents were encouraged to attend the program.
Instead of empowering employees, students in kindergarten and the first grade were empowered and educated. Students were educated on skin cancer prevention strategies centered on improving their knowledge and behavioral intentions. During the EBP project, short-term wins were celebrated when the children were able to correctly answer the sun prevention questions, and when the information was shared with family members and friends by the participants. These short-term wins helped celebrate the positive vision change during the project implementation.

The gains were consolidated after the EBP project completion and change was encouraged. The children were educated on the importance of continuing the sun prevention education and strategies as they progress into their adolescent and adult years. Since the school already supported a lifestyle of health and fitness, the change was placed into the current culture. It is the hope that the school will continue to implement this sun prevention program for years to come and potentially create a concrete policy for the school corporation.

**Strengths and Limitations of Theoretical Framework for EBP Project**

Strengths of the theoretical framework include the parallelism of the framework with the EBP project. The steps that were initiated during the EBP project correlated with the eight steps of change that Kotter suggested. The eight steps of change made the long-term change appear more feasible. It was clear that there was a need for practice change at this location and within this population, and the framework worked as a tool to ensure that the change occurred.

The main limitation included the fact that the original framework focuses more on the change within a company/organization than it does a school. The framework had to be tailored to fit within the school setting but the steps of Kotter’s change model were thoroughly implemented. In addition, instead of discussing a topic such as finances, the topic was the skin health of children. This limitation caused some slight confusion during the process, but was easily managed with the use of critical thinking by the project leader.
Evidence-based Practice Model

Overview of EBP Model

In addition to Kotter’s Change model, the ACE Star model was used during the development of the EBP project. The ACE Star model was established in January 2000 as a Center of Excellence for the University of Texas Health Science Center in San Antonio (2012). The purpose of the ACE Star model is to transfer new knowledge into clinical practice. The model depicts the systematic importance of cycles, nature, and knowledge. The ACE Star consists of five main points of the star, which include: (1) discovery research, (2) evidence summary, (3) translation to guidelines, (4) practice integration, and (5) process, outcome evaluation (Stevens, 2012).

The first point of the star is aimed at generating knowledge through the use of traditional research methodologies and scientific inquires (Stevens, 2012). The work of previous clinicians and researchers is considered and a review of the literature is conducted. The information is then synthesized and the new knowledge is used to guide the EBP project.

The second point of the ACE Star model is the evidence summary, which is unique to the EBP process (Melynk & Fineout-Overholt, 2005). During the evidence summary stage, evidence from all research knowledge is synthesized into a single meaningful statement of the state of science (Stevens, 2012). Evidence summaries are often randomized control trials that are combined to create systematic reviews, evidence syntheses, integrative reviews, and meta-analyses (Stevens, 2012).

In order to translate the guidelines, the evidence summary is combined with clinical expertise during the third point of the star (Stevens, 2012). “At this stage of transformation, the knowledge now reflects best practice based on best research evidence and consensus and endorsement of experts” (Melynk & Fineout-Overholt, 2005, p. 424). During this point on the star, summarized research evidence is interpreted and combined with other sources of
knowledge, and then contextualized to the specific client population and setting (Stevens, 2012).

The fourth point on the star, entails implementing the research into practice (Stevens, 2012). This stage incorporates all of the hard work from the previous points so that the best evidence is being implemented in the community. Cost efficiency, timeliness, and usefulness for the clinician and client are critical during this stage (Melynk & Fineout-Overholt, 2005).

The fifth and final point of the ACE Star model is the evaluation stage. During this stage, the information is considered and conclusions are made. Scores prior to the implementation and following the implementation highlight the positive or negative effects of the project.

**Application of EBP Model to EBP Project**

During the EBP project, the project leader discovered research and knowledge by conducting an extensive literature review. Many different levels of literature were obtained, which led to the formation of the clinical question. Even though sun prevention programs are available and school corporations are aware that sun prevention education is necessary, few schools incorporate sun prevention programs into their curriculum. For that reason, the decision was made by the project leader to move forward and complete the evidence summary.

The EBP project evidence was synthesized after the literature review was completed. Following the synthesis of the evidence, a critical appraisal of the evidence was completed. The evidence synthesis on school-based sun prevention programs served as the guiding force of the EBP project. The EBP project consisted of multiple clinical practice guidelines, including those endorsed by the CDC. The best guideline targeted children in kindergarten and the first grade, and was implemented on the elementary school setting.

SPF with Ray, proposed to integrate the most current best available evidence on sun prevention education for elementary school students in kindergarten and the first grade. The EBP project leader considered costs, time and usefulness during the program planning stage. There were minimal costs associated with the program. Time was considered when speaking
with the principal because children this young have a limited attention span. Lastly, the project’s usefulness is supported by the current evidence.

Evaluation of the project was conducted using a pre-test before the program start date, and two post-tests completed on the two Fridays following the program end date. The second post-test was created in order to see how well the children retained the information. As the students’ knowledge was transformed during the ACE Star model points, the final outcomes included an increase in knowledge and behavioral intentions regarding proper sun prevention strategies which prevent the development of skin cancer.

**Strengths and Limitations of EBP Model for EBP Project**

The greatest strength of the EBP model and project combination is the fact that both have a common goal: to generate new knowledge. The ACE Star model aimed to create new knowledge by evaluating current research, while the EBP project also created new knowledge for the children by assessing the current research. The ACE Star model is unique because it does shadow the EBP process, which is essential when creating an EBP project. The five points of the star highlight the main points and can be used as a guide for many knowledge-based interventions.

The greatest limitation pertaining to this model and project is the unfortunate truth that the model does not address behavioral intentions in children. It appears that this project may have needed two models in order to address both knowledge and behavior. Unlike other models, there is not a “linear guide” which explains exactly what the EBP project leader should complete next. Instead, the model moves in a cyclic manner and does not have an ending. Thus, the project leader may question if the model/EBP project is supposed to end, or repeat the cycle.
Literature Search

Sources Examined for Relevant Evidence

A search for the best, most current literature was initiated to identify and summarize the best available evidence related to school-based sun prevention programs for children in kindergarten and the first grade. The database sources examined include CINAHL, MEDLINE via EBSCO, Nursing and Allied Health Database, Joanna Briggs Institute, Cochrane Library, National Guideline Clearinghouse, ERIC, and PsycINFO. A meeting with the Valparaiso University health sciences librarian was conducted for assistance in narrowing search terms and finding a systematic review. The MeSH (medical subject heading terms) system was used in the literature search for this project to ensure consistency.

Initial key words used in the literature search included skin cancer, sun awareness, sun protection, prevention, program, intervention, education, children, and kids. After refining the literature search with the university librarian, the final combination of key words, phrases, and search terms utilized include “skin cancer” OR “sun prevent*” OR “sun aware*” OR “sunburn prevent*” OR “sun protect*” AND prevent* OR program* OR intervent* OR educat*. Search terms were reviewed within the abstracts of all databases using the same key phrases.

Abstracts were obtained for review if they were (a) peer reviewed, (b) written in English, (c) published within the last ten years, (d) incorporated school-based interventions, and (e) included preschool children (2-5 years old) or children (6-12 years old). Articles were excluded from review for the following reasons, the article (a) focused on the use of tanning devices; (b) solely implemented interventions in recreational settings such as pools, zoos, parks, etc.; (c) evaluated risk factors for skin cancer; (d) evaluated current treatment approaches for skin cancer; (e) implemented interventions solely in middle-school or high-school settings; (f) utilized interventions over the summer season; and (g) focused on the adult population. Articles with any of these topics as a focus were excluded because of limited applicability to the targeted population or intervention of interest.
After a full review of the abstracts and elimination of duplicate citations within all searched databases, a total of 12 articles were appropriate for evidence within the EBP project. When searching within CINAHL, there were a total of 102 abstracts, with six articles meeting the criteria for inclusion in the project. Medline via EBSCO yielded 284 initial abstracts, and five articles were used, but were originally identified in CINAHL. The search within the Nursing and Allied Health Database resulted in 256 abstracts, with four useful to the project, but three were duplicate articles from previous searches. Non-nursing databases such as those focusing on education and psychology were reviewed for relevant articles. Searching within ERIC yielded 7 abstracts, one of which was applicable. While searching within PsycINFO generated 52 abstracts, the two applicable articles were duplicate citations retrieved during previous database searches. When searching within the Joanna Briggs Institute, Cochrane Library, and National Guideline Clearinghouse no articles were found useful for inclusion. Two articles were located via searching the official CDC website. One article was obtained after contacting the MD Anderson’s Sunbeatables program via email communication. Lastly, two systematic reviews were obtained by citation chasing the Surgeon General’s Call to Action. The evidence search results are illustrated in table 2.1.

**Appraisal of Relevant Evidence**

The quality of the evidence found in the literature review was appraised using the Critical Appraisal Skills Programme (CASP) (2017). The quality of the evidence was numerically grouped into the categories: excellent, good, fair, or poor. Following the appraisal of the twelve pieces of evidence, it was determined that seven articles were excellent, three articles were good, and two articles were fair. None of the chosen articles were of poor quality.

**Levels of Evidence**

Twelve pieces of evidence were included for the final appraisal: three practice guidelines (Level I), two randomized control trials (RCT) (Level II), one cross-sectional (Level II), one non-
randomized control trial (Level III), and five expert opinions (Level VII). The level of the evidence was determined using the Melnyk and Fineout-Overholt (2005) rating system.
Table 2.1

_Evidence Search Table_

<table>
<thead>
<tr>
<th>Database Searched</th>
<th>Articles Found</th>
<th>Duplicate Article</th>
<th>Abstracts Reviewed</th>
<th>Articles Appraised</th>
</tr>
</thead>
<tbody>
<tr>
<td>CINAHL</td>
<td>102</td>
<td>0</td>
<td>46</td>
<td>6</td>
</tr>
<tr>
<td>EBSCO</td>
<td>284</td>
<td>58</td>
<td>15</td>
<td>0</td>
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<tr>
<td>Nursing Allied Health Database</td>
<td>256</td>
<td>110</td>
<td>22</td>
<td>1</td>
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<tr>
<td>ERIC</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>PsycINFO</td>
<td>52</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Internet</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>4</td>
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</tbody>
</table>
Table 2.2

Appraisal of Evidence Table

<table>
<thead>
<tr>
<th>Citation (APA)</th>
<th>Purpose</th>
<th>Design</th>
<th>Sample</th>
<th>Results/Findings</th>
<th>Limitations</th>
<th>Level/Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batista, T., Fissmer, M.C., Porton, T.R.B., Schuelter-Trevisol, F. (2013). Assessment of sun protection and skin cancer prevention among preschool children. <em>Revista Paulista de Pediatria</em>, 31(1), 17-23. Retrieved from <a href="https://valpo.iliad.oclc.org/iliad/IVU/iliad.dll?Action=10&amp;Form=75&amp;Value=256544">https://valpo.iliad.oclc.org/iliad/IVU/iliad.dll?Action=10&amp;Form=75&amp;Value=256544</a></td>
<td>To investigate parental care of their children’s skin by using sunscreen and physical sun protection methods.</td>
<td>Cross-sectional</td>
<td>Preschool children aged between zero and five years old selected from public and private schools in Tubarão, state of Santa Catarina. 361 children were studied and 228 (63.2%) of them attended public schools.</td>
<td>Skin color was predominantly white (78.8%). Of the total, 16 (4.4%) used sunscreen every day and year-round, and 253 (70.1%) were under physical sun protection. White-skinned children used more sunscreen than dark-skinned ones, especially in the summer (p=0.001), and they were more prone to reapply the product (p=0.04). High household income showed a positive association with daily use of sunscreen (p=0.01).</td>
<td>In this study, the data may have been skewed because the intervention was aimed at information from the parents, not the children. Many parents may have failed to fill out the questionnaire properly.</td>
<td>Level II/ C</td>
</tr>
<tr>
<td>Centers for Disease Control and Prevention [CDC]. (2008). Shade planning for America’s schools. <em>Centers for Disease Control and Prevention</em>, 1-53. Retrieved from <a href="https://www.cdc.gov/cancer/skin/pdf/shade_planning.pdf">https://www.cdc.gov/cancer/skin/pdf/shade_planning.pdf</a></td>
<td>To create and maintain a physical environment that supports sun safety by ensuring that school grounds have adequate shade.</td>
<td>Expert Opinion</td>
<td>Students (all ages), teachers, principals, parents, staff, and visitors</td>
<td>The key points of the manual include: (1) Administrators need to be aware of the damaging effects of solar UV radiation (2) Strategies for providing shade (3) Explaining the implementation process (4) Discussion about how strategies may have to be tailored to a specific school (5) Reintroduction to solar geometry (6) How to conduct a shade audit</td>
<td>The manual is aimed at helping schools, but does not extend to additional places in the community where children may be exposed to high levels of UV radiation.</td>
<td>Level VII/ A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Practice Guideline</th>
<th>Schools primary and secondary (children 5-18 years old)</th>
<th>Broad guidelines include: 1) School-based sun prevention policy 2) Environmental Change 3) Education 4) Family Involvement 5) Professional Development 6) Health Services 7) Evaluation</th>
<th>The guidelines do not address additional settings where childcare takes place, such as daycares, sports fields, playgrounds, etc. However, the information can be applied to those settings.</th>
</tr>
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<tbody>
<tr>
<td>The purpose is to improve health of young persons by promoting behaviors to prevent leading causes of illness and death. Skin cancer prevention programs are encouraged to be implemented in school health programs.</td>
<td></td>
<td>Level I/A</td>
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<tr>
<td>The goal of “Sun Protection is Fun (SPF)” was to increase the sunscreen and sun avoidance practices of preschool staff to protect children from sun exposure.</td>
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<tr>
<td>Randomized Control Trial</td>
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<tr>
<td>22 preschools over a 24 month period. Staff in SPF intervention preschools received training, an instructional video, newsletters, the SPF curriculum and teacher’s guide, and sunscreen. Staff in comparison preschools received the Under Cover (skin cancer prevention) brochure produced by the University of Texas M. D. Anderson Cancer Center (1995) and were asked to maintain their usual routine (e.g., if staff would usually apply</td>
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<td>Behavioral items had 5-point Likert response scales ranging from never to always. Item scores were summed to create aggregate scale scores for Sunscreen Use (Cronbach’s α = .87) and Sun Avoidance (i.e., protective clothing and shade; α = .56). Confirmatory factor analyses of the Sunscreen and Sun-Avoidance Scales showed them to be unidimensional.</td>
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<td>Limitations include that the study was implemented over 24 months and many individuals do not have the time to implement a program and see if the results are effective.</td>
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<td>Level II/A</td>
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<td>sunscreen that parents brought from home, they would continue to do so).</td>
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<tr>
<td>To determine whether a multicomponent sun protection program delivered in pediatric clinics during the summer could increase summertime sun protection among young children.</td>
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<tr>
<td>Randomized Controlled Trial</td>
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<tr>
<td>Randomized controlled clinical trial with 4-week follow-up that included 300 parents or relatives (hereafter simply referred to as caregivers [mean age, 36.0 years]) who brought the child (2-6 years of age) in their care to an Advocate Medical Group clinic during the period from May 15 to August 14, 2015. Of the 300 caregiver-child pairs, 153 (51.0%) were randomly assigned to receive a read-along book, swim shirt, and weekly text-message reminders.</td>
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<td>Of the 300 caregiver-child pairs, the 153 children in the intervention group had significantly higher scores related to sun protection behaviors on both sunny (mean [SE], 15.748 [0.267] for the intervention group; mean [SE], 14.780 [0.282] for the control group; mean difference, 0.968) and cloudy days (mean [SE], 14.286 [0.282] for the intervention group; mean [SE], 12.850 [0.297] for the control group; mean difference, 1.436).</td>
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<td>Even though the study was implemented in a clinic, it is possible to transfer these findings to a school setting and continue to incorporate parents into the program. Thus, interventions such as a read-along book, swim shirt, and weekly text-message reminder may be considered.</td>
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<td>Level II/ B</td>
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</table>
related to sun protection behaviors (intervention group) and 147 (49.0%) were randomly assigned to receive the information usually provided at a well-child visit (control group).
<table>
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<tbody>
<tr>
<td>To explore childhood ultraviolet radiation exposure and skin carcinogenesis, review prevention practices, analyze indoor tanning trends, identify skin cancer prevention programs, and address the role of the oncology nurse in youth-focused community initiatives.</td>
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<tr>
<td>Expert Opinion</td>
</tr>
<tr>
<td>Children of all ages</td>
</tr>
<tr>
<td>Skin cancer is on the rise in our community, especially the incidence of melanoma. Thus, children must be educated at an early age. Nurses can play a pivotal role in reducing the burden of skin cancer through patient education, community outreach, and political action.</td>
</tr>
<tr>
<td>While nurses can play a pivotal role in reducing skin cancer because of their education level, many people in the community can also make a difference. The article does not explain how other community members such as teachers, daycare workers, and parents can also help these children.</td>
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<td>Level VII/ A</td>
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<tr>
<td>The recommendations aim to raise and maintain awareness – and increase knowledge – of the risks of UV exposure, influence attitudes and prompt behavior change.</td>
</tr>
<tr>
<td>Practice Guideline</td>
</tr>
<tr>
<td>All members of the public</td>
</tr>
<tr>
<td>Schools' sun safety policies should include a number of key areas: (1) Sun safety education (2) Access to shade (3) Clothing (4) Sunscreen (5) Timetabling</td>
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<tr>
<td>In addition, the time of specific activities should be considered. For example, it may not be appropriate for children to go outside during the hottest times of the day.</td>
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<tr>
<td>The guideline identifies the problem, but fails to identify certain interventions that will help children become more sun aware.</td>
</tr>
<tr>
<td>Level I/B</td>
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</table>

| To explore how the implementation of cognitive-behavioral interventions have on effects of knowledge about sun protection in preschoolers. | Non-randomized Control Trial | Children grouped in the categories of 3-4 years old and 5-6 years old. Same size of 80 children (34 children in cognitive-behavioral group and 46 children in control group). | The theatre play improved knowledge over all age groups (p<0.05; $n^2=0.06$). Age-specific analyses showed better results for children aged 5 to 6 (p<0.05; $n^2=0.20$) compared to children aged 3 to 4 years (p=0.17; $n^2=0.04$). | Conclusions can be made related to children who are older than preschooler, such as kindergarteners and first graders, have a greater chance of success using cognitive-behavioral interventions in order to improve knowledge. | Level III/ A |
| The Guide to Community Preventative Services [The Task Force]. (2013). Skin cancer: Child care center-based intervention. The Community Guide. Retrieved from https://www.thecommunityguide.org/findings/skin-cancer-child-care-center-based-interventions | To recommend child care center-based skin cancer prevention interventions that include implementation of sun protection policies along with education of staff and parents. This recommendation is based on sufficient evidence that these interventions increase children's protection from excessive UV exposure. | Practice Guideline | Children birth to 12 years of age, with a mean age group of 3-5 years old. | After reviewing a multitude of sun protection intervention, it was concluded that the programs positively improved: sunscreen use, hat use, clothing use, shade use while outdoors, and sunburn incidence. The results can be applied to the following settings: daycare centers, nursery schools, playschools, and preschools. | There is no one intervention that was identified as the “best” intervention when educating children about sun safety/protection. Due to the high volume of interventions, it is clear that a multi-interventional approach is best. | Level I/A |
| **US Department of Health and Human Services [HHS]. (2014). The Surgeon General’s call to action to prevent skin cancer. US Department of Health and Human Services, Office of the Surgeon General. Retrieved from http://www.surgeongeneral.gov/library/calls/prevent/prevent-skin-cancer** | **To initiate a comprehensive approach to prevent skin cancer, bringing together community partners, business leaders, government agencies, and individuals for a common cause.** | **Expert Opinion** | **All individuals from birth to death** | **The Call to Action goals include: (1) Increase opportunities for sun protection in outdoor settings (2) Provide individuals with the information they need to make informed, healthy choices about UV exposure (3) Promote policies that advance the national goal of preventing skin cancer (4) Reduce harms from indoor tanning (5) Strengthen research, surveillance, monitoring, and evaluation related to skin cancer prevention** | **The expert opinion does not include a large amount of high level evidence to support their findings. There were only a few systematic reviews included.** | **Level VII/ A** |
| Current literature demonstrates that counseling patients about sun protection reduces intermediate outcomes of skin cancer. |
| Expert Opinion | Children, adolescents, and young adults aged 10 to 24 years who have fair skin |
| Recommendations include counseling children, adolescents, and young adults aged 10 to 24 years who have fair skin about minimizing their exposure to UV radiation to reduce risk for skin cancer. Interventions include: community-based communications and policy regulation. The goal is to increase preventive behaviors among populations in specific settings. |
| The recommendation does not acknowledge those children less than 10 years old, regarding appropriate behavioral counseling. It can be assumed that they may not be mature enough to comprehend the urgency of the subject. |
| Level VII/ C |
|---|---|---|---|---|
| To highlight the importance of evidence-based practice skin cancer prevention, implementation and impact of prevention strategies, and the future impact of prevention efforts. | Expert Opinion | All individuals from birth to death | The CDC grand round was written as a response to the Surgeon General’s Call to Action (2014). The grand round committee concludes that the halt of skin cancer incidence will not only save lives, but will save our country millions of dollars. Foundations such as, MD Anderson, and SunWise, etc., are targeting children at a young age. Early interventions and educations may be the answer to reducing skin cancer incidence. | The expert opinion supplies the information about “why” school-based programs are beneficial and supports those statements with statistical evidence, but does not provide guidance about proper interventions to implement in schools. | Level VII/ B |
Level I evidence. Glanz, Saraiya, and Wechsler (2002), opened up a new level of communication regarding skin cancer when the authors worked with the CDC to develop practice guidelines for skin cancer prevention in children. The report included state and local health and educational agencies and nongovernmental organizations concerned with improving the skin health of students. The guideline was developed in response to studies indicating that protection from UV exposure during childhood and adolescence reduces the risk for skin cancer (Glanz et al., 2002). The CDC’s guidelines included seven recommendations for schools from prekindergarten through the twelfth grade to encourage skin cancer prevention. The seven recommendations included: (a) development of policies; (b) creation of physical, social, and organizational environments that facilitate protection from UV rays; (c) education of young persons; (d) development of professional staff; (e) involvement of families; (f) implementation of health services; and (g) evaluation of program outcomes (Glanz et al., 2002).

Material in the guideline can be used to develop sun prevention programs all across the United States. Local teachers and other school personnel, health service providers, community recreation program personnel, policymakers, and parents can also use the material and implement sun prevention programs which are aimed at protecting the youth. Even though the guidelines have been created for schools, they could also be used as a guide in other child care facilities and organizations. The guideline is clear, concise, and outlines the implementation of sun prevention programs. Appraisal of this article is considered excellent. Therefore, the evidence within the guideline includes significant information which is beneficial when implementing a school-based sun prevention program.

Level I evidence. The National Institute for Health and Care Excellence (NICE) (2011) created a practice guideline that aimed to raise and maintain awareness and increase knowledge of the risks of UV exposure, influence attitudes and prompt behavior change. School corporation officials were encouraged to initiate sun prevention programs in school (NICE, 2011). According to the guideline, schools’ sun safety policies should include a number of key
areas. These key areas include: sun safety education, access to shade, clothing, sunscreen, and timing (NICE, 2011). Timing may have been the most important area of the recommendation. For example, students should not be required to go outside during the hottest times of the day. Schools should be flexible when considering the UV index rating scale and check the temperature frequently. By doing so, many sunburns could be prevented. One limitation of the guideline was that specific interventions are not identified related to creating a program. Appraisal of this article was considered good. Therefore, the lead investigator had to pull information from other articles and combine the findings with the practice guidelines.

**Level I evidence.** The Guide to Community Preventative Services (The Task Force) (2013) is a practice guideline which was found through a citation chase from the Surgeon General’s Call to Action. The purpose of the practice guideline was to recommend child care center-based skin cancer prevention interventions which include implementation of sun protection policies along with education of staff and parents (The Task Force, 2013). This recommendation is based on sufficient evidence that these interventions increase children’s protection from excessive UV exposure. The guideline was unique because it includes the need to educate the parents too (The Task Force, 2013).

After the researchers reviewed a multitude of sun protection interventions, it was concluded that the programs positively improved: sunscreen use, hat use, clothing use, shade use while outdoors, and sunburn incidence (The Task Force, 2013). The results can be applied to the following settings: daycare centers, nursery schools, playschools, and preschools (The Task Force, 2013). Any setting where young children are exposed to UVR may benefit from the program. The guideline suggested that there is no single intervention which was identified as the “best” intervention when educating children about sun safety/protection (The Task Force). Due to the high volume of interventions, it was clear that a multi-interventional approach is best when creating a sun prevention program. The use of imagery, imagination, and discovery were preferred. The appraisal of this article was considered excellent.
**Level II evidence.** Batista, Fissmer, Porton, and Schuelter-Trevisol (2013), conducted a cross-sectional design which was aimed at investigating parental care of their child’s skin by using sunscreen and physical sun protection methods. Children from newborn to five years old from public and private schools were the sample population. The findings concluded that fair-skinned children used more sunscreen than dark-skinned children, especially in the summer (Batista et al., 2013). In addition fair-skinned children were more prone to reapply the product (Batista et al., 2013). However, the researchers suggested that fair-skinned children are at a higher risk of obtaining skin cancer. High household income showed a positive association with daily use of sunscreen (Batista et al., 2013).

The article suggested that after children are educated on sun prevention; fair-skinned, high income children have the highest possibility of continuing a sun prevention program long-term (Batista et al., 2013). In this particular study, one limitation was the risk for skewed data so the appraisal of the article was considered fair. Parents may have failed to fill out the questionnaire properly or made it appear that their child was following proper sunscreen techniques (Batista et al., 2013).

**Level II evidence.** The article, “Effects of a Preschool Staff Intervention on Children’s Sun Protection: Outcomes of Sun Protection is Sun,” was obtained via email from the creators of the sun prevention program, Ray and the Sunbeatables. Ray and the Sunbeatables is a team of child superheroes who were created by the MD Anderson Foundation with the goal of combatting skin cancer in young children through the use of early education and engaging activities. The program offered curriculum guides for teachers in preschool, kindergarten, and the first grade which help guide the implementation of the sun prevention program.

The goal of the article which helped mold the project was to: increase the sunscreen and sun avoidance practices of preschool staff to protect children from sun exposure (Gritz et al., 2007). Over twenty-two preshools were included in the research over a twenty-four month period of time. The staff received training related to skin cancer prevention strategies, watched
an instructional video, were given newsletters, read the teacher’s guide for the program, and were educated on the importance of sunscreen application (Gritz et al., 2007). Half of the teachers received an educational brochure which outlined proper sunscreen education and the other half of the teachers maintained their regular protocol (to apply sunscreen that parents brought from home) (Gritz et al., 2007). Even though the article was implemented on children in preschool, it was concluded that children with a higher reading level and more maturity better grasped the sun prevention education (Gritz et al., 2007). For that reason, the EBP article population was children in kindergarten and the first grade. The article concluded that sunscreen use and sun avoidance practices improved in the group of children whose teacher was better educated on the sun prevention information (Gritz et al., 2007). Ray and the Sunbeatables, laid out the information in a clear and concise manner for the teachers who were going to implement it. Thus, the appraisal of the article was considered excellent.

**Level II evidence.** The goal of the randomized control trial (RCT), “Effectiveness of a Multicomponent Sun Protection Program for Young Children,” was to determine whether a multicomponent sun protection program delivered in pediatric clinics during the summer could increase summertime sun protection among young children (Ho et al., 2016). The program included a four week follow-up after the interventions occurred (Ho et al., 2016). 153 children out of 300 were randomly assigned to receive a read-along book, swim shirt, and the parent was to receive weekly text message reminders related to sun protection behaviors (Ho et al., 2016). The remaining children received the standard information provided at the well-child visit. One limitation of the study does include the setting. The program was implemented in a clinic instead of a school; however, the information could apply to a school-based intervention as well. The appraisal of the article was considered good.

**Level III evidence.** The non-randomized control trial, “Sun Protection Training Based on Theatre Play for Preschoolers: An Effective Method for Imparting Knowledge on Sun Protection?” was created to explore how the implementation of cognitive-behavioral
interventions affected knowledge about sun protection in preschoolers (Seidel et al., 2013). During the study, children were grouped into two categories: 3-4 years old, and 5-6 years old (Seidel et al., 2013). Eighty children (34 in the cognitive-behavioral group and 46 in the control group) participated in the study (Seidel et al., 2013). The children were asked to participate in theatre play which was focused on the implementation of sun protection strategies (Seidel et al., 2013). Similar to the level one article, the authors concluded that children must use imagery, imagination, and discovery when learning about skin cancer (Seidel et al., 2013). The theatre play was most effective because its purpose was to change behavior through the use of play techniques.

It was concluded that the theatre play improved knowledge over all age groups (Seidel et al., 2013). However, age specific interventions showed better results for children five to six than children three to four (Seidel et al., 2013). Children who are five and six years old have more experience being in school and are more experienced in how to pay attention for a prolonged period of time. In addition, at that age children become very curious about new information and people. The children who were five and six were able to understand the information and apply it to their daily knowledge. The appraisal of this article was considered excellent.

**Level VII evidence.** When the project leader searched the CDC website, the expert opinion, “Shade Planning for America’s Schools” was discovered. The opinion suggested that students, teachers, principals, parents, staff members, and visitors, must all be on the same page when discussing sun prevention techniques. The purpose of this manual was to create and maintain a physical environment which supports sun safety by ensuring that school grounds have adequate shade (CDC, 2008).

Many schools and playground areas do not include any shade from trees or physical structures. Instead, students are required to participate in recess/activities/sports while directly in the sun. An increase in shade education would allow for an open discussion between school
administrators regarding shade areas and possible “back-up” plans for when the UV index is too high. The key points of the manual included: (1) administrators need to be aware of the damaging effects of solar UV radiation, (2) strategies for providing shade need to be discussed, (3) explanation of the implementation process is necessary, (4) open discussion about how strategies may be tailored to a specific school is necessary, (5) there needs to be a reintroduction of solar geometry, and (6) staff needs to be educated on how to conduct a shade audit (CDC, 2008). The appraisal of this article was considered excellent.

**Level VII evidence.** Maguire-Eisen (2013) created an expert opinion that highlighted the danger that children are exposed to when they are in the sun. The purpose of the opinion was to explore childhood UVR and skin carcinogenesis, review prevention practices, analyze indoor tanning trends, identify skin cancer prevention programs, and address the role of the oncology nurse in youth-focused community initiatives (Maguire-Eisen, 2013). The author addressed the realization that skin cancer is on the rise in our community, especially the incidence of melanoma (Maguire-Eisen, 2013). Educating children at an early age allows children to better understand the information and apply it to later in life (Maguire-Eisen, 2013). For example, when teenagers are educated about tanning beds, it is often too late because many teenagers start tanning at a very early age. Educating children allows them more time to understand the harmful effects that tanning has on the skin.

One way to educate children in the community is to encourage nurses in the community to speak with children about healthy behaviors (Maguire-Eisen, 2013). Oncology nurses can play a pivotal role in the education of skin cancer through the use of prevention programs (Maguire-Eisen, 2013). The project leader of the EBP project was an oncology nurse in the community at the time of the project and was well educated on skin cancer through personal and professional experience. In addition, patient education, community outreach, and political action may improve skin cancer prevention in the community (Maguire-Eisen, 2013). The author continued to explain that while nurses can play a pivotal role in reducing skin cancer because of
their level of education regarding the subject matter, many other people in the community can also make a difference (Maguire-Eisen, 2013). However, one limitation is the fact that the author did not give specific details about how community members like teachers, daycare workers, and parents can help (Maguire-Eisen, 2013). The expert opinion does recognize the MD Anderson Foundation and their work with the program, Ray and the Sunbeatables (Maguire-Eisen, 2013). The author encouraged the implementation of similar programs in school-based interventions (Maguire-Eisen, 2013). The appraisal of the article was considered excellent.

**Level VII evidence.** The skin cancer epidemic was brought to light by the US Department of Health and Human Service (HHS) (2014). The expert opinion, “The Surgeon General’s Call to Action to Prevent Skin Cancer” highlighted how the use of community/school-based interventions can positively impact children (HHS, 2014). The purpose of the manual was to initiate a comprehensive approach to prevent skin cancer, bringing together community partners, business leaders, government agencies, and individuals for a common cause (HHS, 2014).

The manual initially provided education regarding what skin cancer is and established a sense of urgency for the reader. The goals of the Call to Action included: (1) increase opportunities for sun protection in outdoor settings, (2) provide individuals with the information they need to make informed, healthy choices about UV exposure, (3) promote policies that advance the national goal of preventing skin cancer, (4) reduce harms from indoor tanning, and (5) strengthen research, surveillance, monitoring, and evaluation related to skin cancer prevention (HHS, 2014). The appraisal of this article was considered excellent.

**Level VII evidence.** An expert opinion which explains specific details regarding age-behavioral counseling was obtained from the US Preventative Services Task Force (USPSTF) (2012). Current literature suggested that counseling patients about sun protection reduces negative skin cancer outcomes. The recommendations included counseling children, adolescents, and young adults aged ten to twenty-four years old who have fair skin about
minimizing their exposure to UV radiation to reduce the risk of skin cancer (USPSTF, 2012). The interventions include: community-based communications and policy regulation with the goal of increasing preventative behaviors among populations in specific settings (USPSTF, 2012).

Children in kindergarten and the first grade did not fit into the age range that recommends behavioral therapy. However, the opinion was created in 2012, before the Surgeon General’s Call to Action was established. In addition, children require more education regarding skin cancer than that of behavioral therapy. Due to the missing data, the appraisal considered the recommendation to be fair.

**Level VII evidence.** The final piece of evidence was an expert opinion which highlights the importance of evidence-based practice skin cancer prevention, implementation and impact of prevention strategies, and the future impact of prevention efforts (Watson et al., 2015). The expert opinion was written as a response to the Surgeon General’s Call to Action (HHS, 2014). The CDC grand committee concluded that the reduction of skin cancer incidence would not only save lives, but would also economically benefit our country. Prevention programs could save our country millions of dollars that can be spent elsewhere. Foundations such as, MD Anderson, and SunWise target children at an early age because early interventions and education may be the answer to reducing skin cancer incidence in communities. Even though the expert opinion did not identify beneficial interventions, it did reinforce the urgency of the epidemic. The appraisal of the article was considered good.

**Construction of Evidence-based Practice**

**Synthesis of Critically Appraised Literature**

The literature review provided an in depth picture of the sun prevention crisis and identified a sense of urgency related to skin cancer prevention in the elementary school population. During the synthesis of the appraised literature, three areas of analysis arose: population, interventions, and length of intervention. Studies included in the appraisal of the
literature revealed comparable findings and recommendations for practice. The common themes are presented below.

**Population.** The literature was divided when choosing whether to educate children or adults in the sun prevention program. All three practice guidelines suggest that educating children would create the most benefit long-term because this education would be carried into their teenage and adult years (Glanz et al., 2002; NICE, 2011; The Task Force, 2013). The guidelines suggested key factors that the project should include and then suggested that children should follow these guidelines in order to maintain healthy skin.

**Interventions.** The literature appraisal suggested that there was not a single intervention that best educates children on the importance of healthy skin protection. Instead, the use of imagery, imagination, and discovery, allowed children to learn about a difficult topic in their own environment where they feel safe (NICE, 2011; Seidel et al., 2013). The evidence suggested that there be a lead character who helps the class learn about skin cancer and the proper sun prevention education (MD Anderson, 2017; Gritz et al., 2007). The character of the EBP was Ray. Ray was a 5 year old boy who just found out that his hero, his grandpa, had skin cancer. Instead of being afraid of skin cancer, he chose to help the project leader learn more about proper sun prevention techniques so that he will not get skin cancer later in his life.

**Length of intervention.** The length of the intervention varied from two days to twenty-four months. Thus, the length of the education program was condensed to fit within the time restraints. Evidence suggested that children must be educated twice in order to consider changing current knowledge and behavior (MD Anderson, 2017; Seidel et al., 2013). In addition, the length of the intervention must not exceed the attention span of the children, thus the purpose for the thirty minute sessions.

**Best Practice Model Recommendation**

The best practice model recommendation developed for this EBP project was synthesized from the most current, best evidence and was critically appraised. Sun prevention
education is often viewed as unimportant in the school setting and is often excluded from the curriculum. However, involving members of the school, administrators, teachers, parents, and other community can help establish a program in response to the skin cancer epidemic and the need to educate children at a young age. The Surgeon General’s Call to Action placed children at the heart of this problem and called on the help of school corporations and child centers with the hope that policies will be implemented for long-term change. Therefore, the school-based sun prevention program was created. This program was developed in a student and teacher-friendly format which is not only easy to understand, but easy to implement. The project leader proposed that implementing the best practice model, SPF with Ray, would demonstrate that students participating in a multicomponent sun prevention school-based program would demonstrate positive shifts in knowledge, and behavioral intentions.

The construction of the evidence-based practice began due to a sense of urgency which surrounded the skin cancer epidemic in our country. The literature review solidified the urgency of the matter and allowed the project leader to find the most current, up to date knowledge regarding the topic. Synthesis of the most current, best evidence determined the best practice model and answered the PICOT question: For children in kindergarten and the first grade, does the early implementation of a multicomponent sun prevention program positively impact the children’s knowledge and behavioral intentions to practice safe sun techniques, as compared to the knowledge and behavior of the children prior to the sun prevention program after a one week period?

How the Best Practice Model will Answer the Clinical Question

The best practice model, SPF with Ray, answered the clinical question because the population, children in kindergarten and the first grade, was the center of the project. The main focus was placed on the education and the safety of the children. The project not only engaged the children, but also challenged them to continue their education regarding skin cancer prevention. The project knowledge/behavior was tested pre/post the education intervention after
a one week period of time. Lastly, the children were asked to answer questions related to
knowledge and behavioral intentions. Although the long-term effect of the education was not
tested, the project leader did test the children again one week post-intervention in order to see if
the project education was sustainable. Future projects may consider returning at a later date in
order to retest the students’ knowledge and behavioral intentions.
CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

The EBP project did create a practice change because there is currently no corporation-wide policy that is aimed at preventing skin cancer in the elementary population. The practice change required the cooperation of the teachers, administrators, parents, students, and other staff members. The main purposes for the practice change include: increased incidence of skin cancer, increased costs to treat skin cancer, lack of community support, lack of school involvement in skin cancer prevention, and lack of education regarding consequences for sun prevention behaviors. It is the hope of the project leader, project facility, and parents that this program will be continued for many years to come.

Participants and Setting

The EBP project, SPF with Ray, was implemented at a local elementary school within the town of Granger, Indiana. Granger is an upper-middle class to upper-class town that consists of about 30,500 residents. Permission for project implementation was obtained from the school principal during May, 2017. During that time, the principal was excited to allow the school and students to participate in the project.

Upon Valparaiso University (VU) Institutional Review Board (IRB) approval, a complete list of all students enrolled in kindergarten and first grade from August, 2017 to December, 2017 was retrieved from the school’s secretarial staff. Dates and times for implementation were scheduled after meeting with the principal in early August. The program was implemented during the month of September because the weather in Indiana was still warm and sunshine was present. Even though the summer was almost over, the children were still able to practice the new sun prevention education during the remainder of the month. September was also a month that was flexible for the teachers’ schedules because many teachers were still trying to create structured lessons for the class.
A convenience sample of all kindergarten and first grade students during the fall 2017 semester was obtained. The anticipated number of participants was 220, based on the class lists that were provided earlier during the project preparation. All students enrolled in kindergarten and first grade were eligible to participate in the program, SPF with Ray. Inclusion criteria included children in: kindergarten or first grade, ages range from 5-7 years old, various socioeconomic classes, children of various skin types, children of various hair colors and children with differing exposure to the sun. Students were excluded from the program if their parents did not agree to sign the parental consent and were excluded from day three of the program if the students were allergic to sunscreen. Students not participating in the EBP project were asked to go to the library and read while the remainder of the class participated in the program.

**Outcomes**

A descriptive, pre-test/post-test (1)/post-test (2) design was used to assess the effectiveness of the multicomponent school-based sun prevention education program, SPF with Ray. The students were tested one week prior to implementation (pre-test), immediately after implementation (post-test 1), and one week following the completion of the project (post-test 2). The second post-test was completed in order to measure the short-term retention of the information. However, the project leader did not evaluate the outcome data of post-test (2) following completion of the intervention. Conclusions were made that the post-test (2) was implemented too soon. Future projects should consider retesting students at a later date. Two major outcomes were evaluated within this EBP project; an improvement in knowledge of sun prevention strategies and the improved behavioral intentions of the students.

**Intervention**

The interventional design was based on the evidence which was identified during the extensive literature review. The evidence suggested that the project be kid-friendly, multi-interventional, and include imagery/imagination. The EBP project included four days of
interventions which were each 30 minutes in length. Each intervention day incorporated essential sun prevention education which was tailored to the kindergarten and first grade population based on recommendations that were discovered in the literature review. The project was led by the project leader, but required help from teachers and the main character of the project, Ray. The boy who played the role of Ray was a 6 year old boy who was not a student in the project’s school corporation. The interventions and information were further explained to the children using a different PowerPoint presentation for each day.

**Safari Time**

The first day was titled, “Safari Time.” The safari focused on the importance of shade from the sun. Each child was recruited by Ray to help him find a shade tree because he walked in the desert for days without shade. The children were educated on the following topics: the hottest times of the day (10 am to 4 pm), the ultraviolet radiation (UVR) index, how the sun is present regardless of the weather, and the negative outcomes of tanning. After the children were educated about the importance of shade, the children were asked to color a leaf. The children went on an adventure to find the trunk of a tree, and then placed the leaves on the tree branches. The intervention concluded when Ray thanked the children for their help finding him a tree. The shade tree remained standing in the hall way as a reminder to the children that shade is important and protects our skin.

**Take a Splash**

The second day was titled, “Take a Splash.” Ray explained to the children that before he went to the pool, he must pack a bag which includes different modes of protective clothing. The project leader worked with the children to decide what to pack in the bag. The protective clothing included: swim shirts, long sleeve shirts, pants, hats, and sunglasses. In addition, the importance of lip balm, towels, and water bottles were discussed. Four children (two boys and two girls) were chosen from each class to race to see who can place on the proper protective clothing the fastest. Two races were conducted in each class; prizes were disseminated to the
winners of each race. Ray commended the winners of the race and the intervention was concluded.

**Block Party**

The third day was titled, "Block Party." Ray introduced the importance of sunscreen application and the project leader reinforced the information. Topics included: the proper sunscreen SPF (≥30 SPF), the frequency of application (every two hours), and the importance of more frequent application of sunscreen if the child is in the water. After the information was presented, the children were asked to go outside and practice applying the sunscreen in teacher-led groups. After the sunscreen was applied, the children were able to play outside on the playground for 15 minutes.

**Ray’s Future**

The fourth and final day was titled, "Ray’s Future." The children were asked to sit on the floor while the project leader read the book, “Skin Sense” by author, Lori Glickman. The book reiterates all of the key points which were discussed during days one, two, and three. While the children listened to the book, the project leader asked the children additional questions which reinforced the learned information and discussed the importance of sharing the sun prevention information with family members and friends. In addition, the children were given apples as a treat while the book was read. At the end of the book, Ray commended the class for “a job well done.”

**Planning**

After the initial meeting with the principal in May, 2017, the project leader focused the majority of the planning on the project intervention activities. The literature guided what information would be placed in the intervention program. After the multicomponent intervention was finalized, a second meeting was initiated with the principal of the school. A copy of the approved IRB, the final parental consent (see Appendix A), a copy of the Power Point presentation (see Appendix B), and the supplemental material for the EBP project were sent to
the principal in August (see Appendix C). After the multicomponent intervention was finalized, a second meeting was initiated with the principal of the school. At that time, the principal granted permission for the project to be implemented.

Data

Measures

Following the collection of the parental consent which included the demographic information to be completed by the parents, students were asked to participate in a pre-test (see Appendix D). The pre-test included questions regarding measured knowledge and intended behavioral intentions for sun safety. The original tests were created by the project leader. The test was adapted to fit the targeted population; elementary students. A response of “yes or no” was included in the pre-test/post-test questionnaire. The intent was to enable the responses to be age-appropriate. The questionnaire took approximately ten minutes to complete. Post-test 1 (see Appendix E) was administered the day following the final intervention session and post-test 2 (see Appendix E) was administered one week following the program completion.

Collection

The project leader obtained a list of all students enrolled in kindergarten and first grade from the secretarial staff prior to the program start date. All students were identified using their initials. The students’ full names were not disclosed in order to provide confidentiality. After the data was collected, it was placed in a manila envelope. The data was locked in a safe in the project leader’s locked office. Following the completion of the data analysis, the data will be kept in the locked office for three years. The pre-test/post-test was administered to students in a group setting in order to save resources and time. The students were asked to place their heads on their desks and cover their eyes during the testing times. The students responded to the questions by raising their hand to either yes or no. Students were instructed by the project leader to answer every question during the test. Following the test, the students were asked to not speak with other students regarding their answers to the questions.
Management and Analysis

The pre-test/post-test questionnaires were taken to the school during the required testing dates but were stored in a locked file within the project leader’s office to ensure confidentiality. Students’ names and other identifying information were not included in any publication. In addition, when the project was disseminated during a project poster presentation, the children’s names and information were kept confidential. Overall, data was treated as confidential. Group data and trends were disseminated to the public. The project was evaluated and the data was analyzed using SPSS Statistics 25 following project completion.

Protection of Human Subjects

The elementary student participants were considered a vulnerable population. IRB submission, feedback, and approval for the EBP project were obtained from the Valparaiso University IRB prior to the implementation start date. Parental consent containing explanations of the project purpose and intervention activities were distributed to all participants and their parents/guardians. Additional brochures could be obtained at the front office if the parents had any further questions related to the project content (see Appendix C). According to the IRB, no child assent was required. Contact information was provided and participants and their parent/guardians were encouraged to contact the project leader or IRB supervisor at any time with questions or concerns.

The parents were educated that the project did not intend to conduct any procedures on human subjects; rather, information was gathered from a pre-test/post-test questionnaire to measure the effectiveness of the interventions. Also, there were no known physical risks to the children who participated in this EBP project. The project did not pose any risks which include: physical, psychological, emotional, or social risks. Parents and children did not receive any monetary benefit from participating in the project. In the future, the school system may mandate the implementation of sun prevention education across all kindergarten and first grade classes.
CHAPTER 4

FINDINGS

The EBP project, Sun Prevention Fun (SPF): A Multicomponent Sun Prevention Program for Children in Kindergarten and First Grade was developed to improve the knowledge and behavioral intentions of child regarding sun prevention techniques. After the synthesis of the literature, the best evidence revealed that a one week, multicomponent sun prevention program was the best fit to answer the EBP project PICOT question. For children in kindergarten and the first grade, does the early implementation of a multicomponent sun prevention program positively impact the children’s knowledge and behavioral intentions to practice safe sun techniques, as compared to the knowledge and behavior of the children prior to the sun prevention program after a one week period? The outcome data was assessed using a pre-test/post-test design. This chapter describes the data analysis of the information using the SPSS statistical software, version 25.0, and illustrates participant characteristics and the effectiveness of the intervention.

Participants

Size

202 students were eligible to participate in the EBP project, and 172 parents consented to the project. The sample size was 172 kindergarten and first grade students enrolled at a Midwest public elementary school. The pre-test was completed by 164 students for a response rate of 95.3% and 171 students completed post-test one for a response rate of 99.4%. The variations in response rate per test were due to the number of student absences.

Characteristics

The kindergarten and first grade students making up the sample size demonstrated the following pre-test/post-test characteristics which are demonstrated in table 4.1. There was no statistical significance in demographics between the pre-test and post-test groups. The
participants' total demographics responded as 50.6% male and 49.4% female (Figure 4.1). The age of the population consisted of 36% five year old students, 52.3% six year old students, and 11.6% seven year old students (Figure 4.2). The students that participated consisted of 50.6% kindergarten students and 49.4% first grade students (Figure 4.3). The students' hair color consisted of 25% blonde, 32.6% light brown, 22.7% dark brown, 5.2% red, and 14.5% black (Figure 4.4). Skin type was 45.9% fair, 51.7% medium/ tan, and 2.3% dark (Figure 4.5). Hours of daily sun exposure were 14.5% 0-1 hours, 50.6% 1-2 hours, 25% 2-3 hours, 7% 3-4 hours, and 2.9% greater than 4 hours (Figure 4.6). Numbers of lifetime sunburns were 77.9% 0-1 sunburns, 20.9% 2-3 sunburns, and 1.2% 4-5 sunburns (Figure 4.7). No participants identified as having had greater than 6 sunburns.
Table 4.1  
*Characteristics of the Participants*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pre-test n (%)</th>
<th>Post-test n (%)</th>
</tr>
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<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>84 (48.4)</td>
<td>86 (50.0)</td>
</tr>
<tr>
<td>Female</td>
<td>80 (46.5)</td>
<td>85 (49.4)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>58 (33.7)</td>
<td>61 (35.5)</td>
</tr>
<tr>
<td>6</td>
<td>87 (50.6)</td>
<td>90 (52.3)</td>
</tr>
<tr>
<td>7</td>
<td>19 (11.0)</td>
<td>20 (11.6)</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kindergarten</td>
<td>82 (47.7)</td>
<td>86 (50.0)</td>
</tr>
<tr>
<td>First Grade</td>
<td>82 (47.7)</td>
<td>85 (49.4)</td>
</tr>
<tr>
<td><strong>Hair Color</strong></td>
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<tr>
<td>Blonde</td>
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<td>42 (24.4)</td>
</tr>
<tr>
<td>Light Brown</td>
<td>51 (29.7)</td>
<td>56 (32.6)</td>
</tr>
<tr>
<td>Dark Brown</td>
<td>38 (22.1)</td>
<td>39 (22.7)</td>
</tr>
<tr>
<td>Red</td>
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<td>9 (5.2)</td>
</tr>
<tr>
<td>Black</td>
<td>24 (14.0)</td>
<td>25 (14.5)</td>
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<tr>
<td><strong>Skin Type</strong></td>
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<td></td>
</tr>
<tr>
<td>Fair</td>
<td>77 (44.8)</td>
<td>79 (45.9)</td>
</tr>
<tr>
<td>Medium/ Tan</td>
<td>83 (48.3)</td>
<td>88 (51.2)</td>
</tr>
<tr>
<td>Dark</td>
<td>4 (2.3)</td>
<td>4 (2.3)</td>
</tr>
<tr>
<td><strong>Daily Sun Exposure (Hours)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-1</td>
<td>1-2</td>
</tr>
<tr>
<td>--------</td>
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<td>------</td>
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**Lifetime Sunburns**

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<th>4-5</th>
<th>6-7</th>
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<td>128 (74.4)</td>
<td>34 (19.8)</td>
<td>2 (1.2)</td>
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<tr>
<td></td>
<td>134 (77.9)</td>
<td>35 (20.3)</td>
<td>2 (1.2)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
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Figure 4.1 Gender Pie Chart

Figure 4.2 Age Pie Chart
Figure 4.3 Grade Pie Chart

Figure 4.4 Hair Color Pie Chart
Figure 4.5 Skin Type Pie Chart

Figure 4.6 Daily Sun Exposure Pie Chart (hours)
Figure 4.7 Lifetime Sunburns Pie Chart
Changes in Outcomes

Statistical Testing

Paired sample t tests were conducted on the subscales: knowledge, behavior, and knowledge/behavior (Table 4.2). Knowledge scores ranged from 0 to 4 with a perfect score of 4. The pre-test minimum score obtained was a 0 and the maximum score was a 4. The post-test minimum score obtained was a 2 and the maximum score was a 4. The knowledge subscale t test revealed a pre-test mean of 3.0793 (sd = 0.90659), and a post-test mean of 3.7603 (sd = 0.52675). There was statistical significance from the pre-test to post-test (t (1) = -9.567, p<0.001).

Behavior scores ranged from 0 to 4 with a perfect score of 4. The pre-test minimum score obtained was a 0 and the maximum score was a 4. The post-test minimum score obtained was a 1 and the maximum score was a 4. The behavior subscale t test revealed a pre-test mean of 2.7012 (sd = 0.99187), and a post-test mean of 3.4211 (sd = 0.89339). There was statistical significance from the pre-test to post-test (t (3) = -7.915, p<0.001).

Total knowledge/behavior scores ranged from 0 to 8 with a perfect score of 8. The pre-test minimum score obtained was a 2 and the maximum score was an 8. The post-test minimum score obtained was a 3 and the maximum score was a 8. The total knowledge/behavior subscale t test revealed a pre-test mean of 5.7805 (sd = 1.50683), and a post-test mean of 7.1813 (sd = 1.23997). There was statistical significance from the pre-test to post-test (t (5) = -12.011, p<0.001).

The reliability and validity of the tool is low. There was no tool found in the literature that addressed the knowledge and behavioral intentions of students related to sun prevention strategies. The knowledge/behavior tool was created by the project leader and was not previously tested. The validity of the tool was created from topics that the project leader discovered during the literature search, but the questions were created by the project leader.
The validity of the tool will improve as additional project leaders continue to use the tool to test the knowledge and behavior of the students.
Table 4.2

*Paired- Sample t Tests for Knowledge, Behavior, and Total Knowledge/Behavior*

<table>
<thead>
<tr>
<th>Subscale</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>3.0793</td>
<td>0.90659</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post 1</td>
<td>3.7603</td>
<td>0.52675</td>
<td>-9.567</td>
<td>0.000</td>
</tr>
<tr>
<td>Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>2.7012</td>
<td>0.99187</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post 1</td>
<td>3.4211</td>
<td>0.89339</td>
<td>-7.915</td>
<td>0.000</td>
</tr>
<tr>
<td>Knowledge/Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>5.7805</td>
<td>1.50683</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post 1</td>
<td>7.1813</td>
<td>1.23997</td>
<td>-12.011</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*M= mean; SD= Standard Deviation, significance p<0.001.*
Significance

The results of the statistical analysis answers the PICOT question: For children in kindergarten and the first grade, does the early implementation of a multicomponent sun prevention program positively impact the children’s knowledge and behavioral intentions to practice safe sun techniques, as compared to the knowledge and behavior of the children prior to the sun prevention program after a one week period? The level of measurement for the pre-test, post-test subscales was interval data. A paired t test was appropriate because it measures interval data of a single group before and after the intervention. The paired t tests for pre-test to post-test for knowledge, pre-test to post-test for behavior, and pre-test to post-test for total knowledge/behavior were statistically significant. Therefore, the four day multicomponent sun prevention program for students in kindergarten and first grade was significant for knowledge, behavior, and total knowledge/behavior.
CHAPTER 5

DISCUSSION

This EBP project examined the impact of a multicomponent sun prevention educational program to improve the knowledge and behavior of children in kindergarten and first grade. The purpose of Chapter five is to provide an evaluation of the findings described in Chapter four, as well as the theoretical and EBP frameworks utilized for the project. Strengths and limitations of the EBP project will be reported and implications for future utilization of the project will be discussed, highlighting the applications to practice, theory, research and education.

Explanation of Findings

The findings of this EBP project provide an answer to the PICOT question: For children in kindergarten and the first grade, does the early implementation of a multicomponent sun prevention program positively impact the children’s knowledge and behavioral intentions to practice safe sun techniques, as compared to the knowledge and behavior of the children prior to the sun prevention program after a one week period? Kindergarten and first grade students were assessed for their knowledge and behavioral intentions in regards to sun prevention education. Statistically significant improvement was found in all three of these areas: knowledge, behavior, and total knowledge/behavior. Originally, the project leader was expecting to analyze the results of the pre-test (2) by retesting the students one week after the intervention. However, it was concluded that enough time did not pass in order to make the results significant. Therefore, the post-test (2) results were not included. Future EBP projects may consider retesting the students at a later date in order to see if the students retained the information regarding sun safety techniques.

Knowledge

Significant improvement in kindergarten and first grade students’ knowledge of sun prevention strategies was demonstrated (p =0.000). During the 4 day intervention, students
were presented the information via PowerPoint, imagery, and were asked to complete multiple
tasks and games. Before the beginning of the next interventional day, the project leader and the
students reviewed the material that was learned the previous day. Repetition may attribute to
the significant improvement in knowledge from the pre-test to post-test.

**Behavior**

Significant improvement in kindergarten and first grade students’ behavioral intentions of
sun prevention strategies was demonstrated (p =0.000). During the 4 day intervention, the
students appeared to be excited and eager to practice sun prevention strategies. Repetition
may attribute to the significant improvement in behavioral intentions from the pre-test to post-
test. If the students are retested at a later date, the results regarding behavior would
demonstrate if students practiced the information that they learned during the project.

**Total Knowledge/Behavior**

Significant improvement in kindergarten and first grade students’ total
knowledge/behavior of sun prevention strategies was demonstrated (p =0.000). The results
conclude that the students not only learned a depth of knowledge during the intervention but are
eager to change behaviors. Repetition may attribute to the significant improvement in
knowledge from the pre-test to post-test.

**Evaluation of Applicability of Theoretical and EBP Frameworks**

The EBP project was built on a theoretical framework, which influenced the practice change, and an EBP framework, which guided the EBP process. Consistency was maintained throughout each stage of the EBP project.

**Theoretical Framework**

Kotter’s Change model was the theoretical framework that helped guide this EBP project. John P. Kotter, recognized that even though many people can recognize the need for a change, few people are interested in enforcing it. Kotter (1996) established the eight stages of change: (1) establishing a sense of urgency, (2) creating the guiding coalition, (3) developing a
vision and strategy, (4) communicating the change vision, (5) empowering employees for broad-
based action, (6) generating short-term wins, (7) consolidating gains and producing more 
change, and (8) anchoring new approaches in the culture. For the EBP project, a sense of 
urgency was established by assessing the current statistics that surround the high incidence of 
skin cancer in the United States.

Strengths of the theoretical framework include the parallelism of the frame work with the 
EBP project. The steps that were initiated during the EBP project correlated with the eight steps 
of change that Kotter suggested. The main limitation included the fact that the original 
framework focuses more on the change within a company/organization than it does a school. 
The framework had to be tailored to fit within the school setting and the steps of Kotter’s change 
model were thoroughly implemented.

**EBP Framework**

The purpose of the ACE Star model is to transfer new knowledge into clinical practice. 
The model depicts the systematic importance of cycles, nature, and knowledge. The ACE Star 
consists of five main points of the star, which include: (1) discovery research, (2) evidence 
summary, (3) translation to guidelines, (4) practice integration, and (5) process, outcome 
evaluation (Stevens, 2012).

The greatest strength of the EBP model and project combination is the fact that both 
have a common goal: to generate new knowledge. The ACE Star model aimed to create new 
knowledge by evaluating current research, while the EBP project also created new knowledge 
for the children by assessing the current research. The greatest limitation pertaining to this 
model and project is the unfortunate truth that the model does not address behavioral intentions 
in children. It appears that this project may have needed two models in order to address both 
knowledge and behavior. In the future, an additional model may be added in order to address 
the behavioral intentions of the students.
**Strengths and Limitations of the EBP Project**

A comprehensive assessment of the strengths and limitations of the EBP project as a whole was completed. The assessment reveals which project details should be utilized in maintenance of the practice change and replicated in future reincarnations of the project. In addition, certain aspects may need to be altered to improve the project.

**Strengths**

The greatest strength of the EBP project was reflected in the project outcomes. The 4 day multicomponent intervention program was statistically significant for both knowledge and behavior. The students were able to be introduced to the topic of sun prevention, while having fun too. Along with the students, the teachers, administrators, and parents were also included in the importance of proper sun prevention strategies. Following the project, many parents expressed their gratitude for the sun prevention program and their ongoing support for sun prevention education.

**Limitations**

There were three limitations that were discovered during the implementation of the EBP project. The first limitation was the time of year that the program was implemented. The project was implementing during the last week of September, and the weather soon turned cold. For that reason, the students were not able to practice their newly learned sun prevention strategies. The second limitation was the financial responsibility that was associated with the execution of the project. The project did cost the project leader around $500 due the high cost of printing ink, prizes, and sunscreen. There were no financial grants that were obtained. The final limitation was the time that had elapsed before the pre-test (2) was implemented. The project leader should have re-tested the students at a later date.
Implications for the Future

The goal of the EBP project is to initiate a practice change that will be integrated and maintained beyond timeframe of the project. Future implications of the EBP project are identified as they affect practice, theory, research, and education.

Practice

The sample identified for this project was kindergarten and first grade students. These students have experienced sun prevention strategies and are striving to improve both knowledge and behavior. These students will contribute to society by practicing sun prevention strategies at an early age and sharing that knowledge with friends and family members. They will be able to take control of their skin health and decrease the risk of obtaining skin cancer later in life. In the future, the EBP project should be implemented in the spring or early summer so that the students can practice implementing their sun prevention knowledge. Also, the financial costs may be decreased if the teachers who are implementing the project have access to cost-effective ink. The teachers may consider asking the parents to provide the sun screen for their students to limit additional costs.

Theory

This EBP project supports the Kotter Change model as a valuable framework for the change in knowledge and behavior and the ACE star model as an appropriate and practical means of progressing through the EBP process. However, future implications may include an additional model in order to address the need to change behaviors related to sun prevention. An alternative solution may include choosing a different model to guide the EBP project.

Research

The implications for research of this EBP project are that it contributes prevention of skin cancer. It also supports the findings of existing studies that indicate that students must be educated at an early age regarding proper sun techniques. The tool created for this project demonstrates low validity and reliability in terms of the knowledge and behavior subscale
because it was primarily created by the project leader. It may be utilized in future studies in order to confirm reliability and validity of the knowledge and behavior subscales. The statistically significant findings of this project show that the intervention supported by the literature was effective. However, in the future the pre-test (2) should be implemented at a later date so the retention of the knowledge and behavioral intentions of the students can be confirmed. For example, if the project is implemented during the spring or the summer, the students should be retested at the beginning of the next school year. The findings warranting further replication to confirm findings and to expand the intervention to more elementary schools.

**Education**

The EBP project confirms the efficacy of a multicomponent approach to improving the sun prevention knowledge and behavior of kindergarten and first grade students. Therefore, it is appropriate for other elementary schools to implement this practice change and educate their students. The intervention is feasible and appropriate for the elementary classroom setting. Since the intervention is only 30 minutes in length, many schools should be able to replicate this exact intervention. It is recommended by the literature, and supported by this project that kindergarten and first grade students should be educated on sun prevention strategies using a multicomponent 4 day program. Education of students and their parents is the first step towards addressing the health crisis: skin cancer.

**Conclusion**

The EBP project sought to address the PICOT question: For children in kindergarten and the first grade, does the early implementation of a multicomponent sun prevention program positively impact the children’s knowledge and behavioral intentions to practice safe sun techniques, as compared to the knowledge and behavior of the children prior to the sun prevention program after a one week period? Findings indicate statistically significant improvement in all three areas: knowledge, behavior, and total knowledge/behavior, from the pre-test to the post-test. The intervention was successfully implemented, which confirmed that it
was an appropriate EBP project for students in kindergarten and first grade. The results demonstrate that sun prevention education is beneficial for school-aged children in regards to improving knowledge and behavior changes, and decreasing the incidence of skin cancer in the community. For that reason, APNs are excellent facilitators of sun prevention education and should continue primary prevention education in schools across the United States.
REFERENCES


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http://guidance.nice.org.uk/PH32

*Penn-Harris Madison School Corporation.* Retrieved from https://northpoint.phmschools.org/about-northpoint-elementary-school


Ms. Gouker graduated from Valparaiso University in 2015 with a Bachelor of Science in Nursing. Prior to attending Valparaiso University, Ms. Gouker was a student at Hanover College, where she was an active member in Up till Dawn, an organization which raises funds for children at St. Jude Children's Hospital. While at Hanover, Ms. Gouker participated in many service programs. Ms. Gouker travelled to Guatemala and China where she worshipped, sang, and aided in constructing playgrounds for many children. Ms. Gouker's passion for health, education, and family led her to the specialty, oncology. She currently works at Saint Joseph Regional Medical Center on the Oncology Unit where she has been nominated for the Daisy Award two years in a row. Last year, she was inducted into Sigma Theta Tau – Zeta Epsilon chapter. Ms. Gouker is currently attending Valparaiso University to earn a Doctorate in Nursing Practice and will graduate in May, 2018. Most recently, Ms. Gouker has become interested in the dermatology field and plans to specialize in dermatology following graduation. Since the passing of her father in 2014, she has committed her nursing career to advocating for primary prevention. This commitment led Ms. Gouker to focus on the need to prevent skin cancer at an early age by implementing a school-based educational program for children in kindergarten and first grade.
ACRONYM LIST

ACE: Academic for Evidence-Based Practice
ACS: American Cancer Society
APN: Advanced Practice Nurse
CASP: Critical Appraisal Skills Programme
CDC: Centers for Disease Control and Prevention
EBP: Evidence-Based Practice
HHS: US Department of Health and Human Services
IDOE: Indiana Department of Education
IRB: Institutional Review Board
MeSH: Medical Subject Heading Terms
NCSL: National Conference of State Legislatures
NICE: National Institute for Health and Care
PHM: Penn-Harris Madison
PICOT: Population, Intervention, Comparison, Outcome, Time
RCT: Randomized Control Trial
SHPPS: School Health Policies and Practices Study
SPF: Sun Prevention Fun
USPSTF: US Preventative Services Task Force
UV: Ultraviolet
UVR: Ultraviolet Ray
VU: Valparaiso University
WHO: World Health Organization
XP: Xeroderma Pigmentosum
Appendix A

Parental Consent Form

PARENTAL CONSENT FORM

Sun Prevention Fun (SPF): A Multicomponent Sun Prevention Program for Children in Kindergarten and First Grade

Parents,

My name is Sarah Gouker. I am a doctorate of nursing practice (DNP) student from Valparaiso University. For the past few months, I have been working on a sun prevention program that is aimed at improving the knowledge and behavioral intentions of children in kindergarten and the first grade. Current evidence-based practice suggests that children who learn sun prevention strategies at an early age are more equipped to make positive choices regarding sun prevention. The topics that will be discussed are: certain hours in the day to avoid sun exposure, UV index rating, protective clothing/gear, proper sunscreen application, and how to teach your family/friends about sun prevention. The program will last for a duration of one week and each session will be 30 minutes long. I sincerely thank you for allowing your child to join, Ray, and his friends, as they strive to prevent skin cancer in our community.

Best Regards,

Sarah Gouker BSN, RN, DNP Student

Child Name (Print): _____________________________________________________________
Parent Name (Print): ____________________________________________________________
Parent Signature: _______________________________________________________________
List your child’s allergies: ___________________________________________________

Circle the demographic information in each column that applies to your child:

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>Grade</th>
<th>Hair Color</th>
<th>Skin Type</th>
<th>Hours of Sun Exposure (daily)</th>
<th>Number of Lifetime Sunburns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>5</td>
<td>Kindergarten</td>
<td>Blonde</td>
<td>Fair</td>
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<td>0-1</td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>First Grade</td>
<td>Light brown</td>
<td>Medium/tan</td>
<td>1-2</td>
<td>2-3</td>
</tr>
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<td></td>
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<td>2-3</td>
<td>4-5</td>
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<td>3-4</td>
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<td></td>
<td>Black</td>
<td></td>
<td>&gt;4</td>
<td>&gt;7</td>
</tr>
</tbody>
</table>

All parents are encouraged to attend the program if they wish! Dates include 9/18/17 to 9/21/17. Please return this form to the teacher by 9/15/17. Contact Sarah, Project Leader, at (574) 323-1174 or Rasha Abed, Valparaiso University Associate Director of Sponsored Research, at (219) 464-5381 with any questions related to the program. A copy of the signed consent will be given to all parents. Thank you again for your support.
Appendix B

PowerPoint Material

SPF (Sun Prevention Fun) with Ray

Sarah Gouker BSN, RN, DNP Student
Valparaiso University
Day One

Meet Ray

https://www.youtube.com/watch?v=8d36LdDUQh4
Safari Time

https://youtu.be/s3-TBf4vGhs

SPF (Sun Prevention Fun) with Ray

Sarah Gouker, BSN, RN, DNP Student
Valparaiso University
Day Two
Pool Time with Ray

- [link](https://youtu.be/ZGydd2ZvV28)

Protective Clothing Race

- Who can put on the protective gear the fastest?
A Message from Ray

https://youtu.be/7y3ElV9T4OM

SPF (Sun Prevention Fun) with Ray

Sarah Gouker BSN, RN, DNP Student
Valparaiso University
Day Three
Don’t Forget the Sunscreen

https://youtu.be/9jizXneyMQQ

SPF (Sun Prevention Fun) with Ray

Sarah Gouker BSN, RN, DNP Student
Valparaiso University
Day Four
Reading Grows our Brain and Keeps our Skin Safe

- https://youtu.be/PQJaAtH85P8

Thank you!!!!!

- https://youtu.be/G3tMQ5VcQwc
Appendix C

Brochure

SPF (Sun Prevention Fun) with Ray
A four day sun prevention program for children in kindergarten and first grade
Appendix D

Pre-test

PRE-TEST

Knowledge:
1.) Are the hottest hours of the day in the morning? NO

2.) Should you wear protective clothing, like sunglasses and hats, when playing in the sun? YES

3.) Should you not put on sunscreen before going outside in the sun? NO

4.) Is it important to teach your family and friends about ways to protect them from the sun? YES

Behavior:
1.) Will you play in the sun during the afternoon? NO

2.) Will you wear protective clothing, like sunglasses and hats, when playing in the sun? YES

3.) Will you put on sunscreen before going outside in the sun? YES

4.) Will you teach your family and friends about ways to protect them from the sun? YES

For each question, correct answers receive a score of 1; incorrect answers receive a score of 0.
Appendix E

Post-test 1 and 2

POST-TEST 1 and 2

**Knowledge:**

1.) Are the hottest hours of the day in the morning? NO

2.) Should you wear protective clothing, like sunglasses and hats, when playing in the sun? YES

3.) Should you not put on sunscreen before going outside in the sun? NO

4.) Is it important to teach your family and friends about ways to protect them from the sun? YES

**Behavior:**

1.) Will you play in the sun during the afternoon? NO

2.) Will you wear protective clothing, like sunglasses and hats, when playing in the sun? YES

3.) Will you put on sunscreen before going outside in the sun? YES

4.) Will you teach your family and friends about ways to protect them from the sun? YES

For each question, correct answers receive a score of 1; incorrect answers receive a score of 0.