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Julia Pederson

University of San Diego, jpederson@sandiego.edu

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UNIVERSITY OF SAN DIEGO

Hahn School of Nursing and Health Science

DOCTOR OF NURSING PRACTICE

Educating and Improving Collegiate Athlete Sunscreen Use

by

Julia Pederson BSN, RN CCRN-CSC

A Doctor of Nursing Practice Portfolio presented to the

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DOCTOR OF NURSING PRACTICE

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Michelle Kabakibi DNP, FNP-C, AGNP-C, Faculty Advisor and Clinical Mentor

Final Manuscript

Educating and Improving Collegiate Athlete Sunscreen Use

Julia Pederson

University of San Diego

Abstract

Introduction: The purpose of this evidence-based practice Doctor of Nursing Practice (DNP) project was to prospectively evaluate the ability to alter the behavior of young adults by providing sunscreen education and thereby reduce their risk of skin cancer from sun exposure. Twenty-three collegiate athletes ages 18 to 21 years old who were on the university softball team were enrolled. These student athletes were then educated about the impact of daily sun protection and risk factors. The goal was to observe an increase in sunscreen use and increase sun exposure awareness.

Background: Skin cancer is the most frequently diagnosed cancer in the United States. In ages 20-29 melanoma of the skin is the third most common cancer. One of the most effective ways to prevent skin cancer in young adults is UV skin protection. Outdoor sport athletes specifically have higher rates of sun exposure, thereby leading to additional risk of melanoma. Based on primary and secondary research, many college athletes lack a basic understanding of skin cancer.

Methods: UV exposure risk and sun protective behaviors were determined by using The Sun Exposure and Protection Index (SEPI). This questionnaire was administered to female softball players before and after the intervention period. Athletes were instructed to apply SPF 50 to any unexposed skin once daily for 14 days before sun exposure. One 15-minute educational session was completed where materials about melanoma were distributed, and sun protection was discussed. This education session was conducted prior to the intervention period.

Results: Twenty-three students participated in the evidence-based practice project and results were primarily evaluated on SEPI Part 2. SEPI Part 2 consists of five questions ranked zero to four with the total score ranging from 0 to 20. The average score of the SEPI Part 2 was 9.65 before the intervention. After the intervention, the average score decreased to 8.81 which reflects an increase

in sun protection habits. While these results are not statistically significant, these small behavior changes will likely have a positive impact over the long term.

Evaluation: Sunscreen application and UV risk screening are successful in targeting behaviors correlated with melanoma risk. If properly incorporated, appropriate sun exposure behaviors decrease lifetime skin cancer risk for college athletes. While this evidence is encouraging, additional efforts are needed to expand educational programs, further reinforce sunscreen application, and modify young adults' behaviors towards sunscreen use.

Keywords: sunscreen, skin cancer, melanoma, young adults

Educating and Improving Collegiate Athlete Sunscreen Use

Background and Significance

Skin cancer is the most frequently diagnosed cancer in the United States (Centers for Disease Control and Prevention, 2022). Unlike most cancers, it is common in young adults. Specifically, melanoma of the skin is the third most common cancer for adults aged 20 to 29 (Miller et al., 2020). This is because repeated exposure is a substantial risk factor and has a compounding effect. According to the Skin Cancer Foundation, (2023), having five or more sunburns doubles your risk of melanoma. They state that the best way to avoid lifelong issues is taking appropriate preventative measures. One of the most effective ways to prevent skin cancer in young adults is UV skin protection.

Outdoor sport athletes specifically have higher rates of sun exposure, thereby leading to additional risk of melanoma (Fernandez-Ruiz et al., 2022). Studies have shown that athletes' sun protection behaviors are often inadequate, despite these athletes understanding risk factors associated with frequent sun exposure without sunscreen (Fernandez-Ruiz et al., 2022). As previously mentioned, there is a compounding effect from cumulative sunburns and often collegiate athletes have trained hard for several years to reach their elite level of competition. Due to their previous UV exposure and the ongoing, prolonged, frequent exposure to ultraviolet radiation, collegiate athletes are at an increased risk of skin cancer (McGuffin et al., 2019). Consistently, the findings have shown that individuals who practice sports outdoors experience substantially higher ultraviolet radiation exposure, routinely exceed the recommended exposure limits, and are at a higher risk of developing skin cancer (Snyder et al., 2020).

Without intervention, the expected outcomes are bleak for this patient population. However, behavioral interventions have been shown to increase sun protection behavior and

intervention can increase skin self-examination (Henrikson et al., 2018). Similarly, most school-based interventions have been seen to improve sun protection behaviors and sun-safe knowledge, (Shue McGuffin, 2019). These findings are supported by the US Preventative Services Task Force (USPSTF), which determined that behavioral counseling interventions are of moderate benefit in increasing sun protection behaviors in children, adolescents, and young adults with fair skin types (US Preventive Services Task Force, 2018).

Purpose

The purpose of this evidence-based practice Doctor of Nursing Practice (DNP) project was to prospectively evaluate the ability to alter the behavior of young adults by providing sunscreen education. The project's goal is to increase education and sunscreen use in the youth population, and more specifically women athletes. This will hopefully reduce their risk of skin cancer from sun exposure. To evaluate this project, twenty-three collegiate athletes ages 18 to 21 years old from a university softball team were enrolled. These student athletes were then educated about the impact of daily sun protection and risk factors. Although the evidence-based practice project is not powered for statistical significance, it will hopefully provide trends which show increased sun exposure awareness is correlated with an increase in sunscreen use.

Evidence-Based Practice Model

This evidence-based practice project is intended to change operations of the softball team to reduce the lifelong risk of melanoma for its student athletes. Therefore, this project is utilizing the Iowa Model, which tends to improve evidence-based practice through its simplified seven step approach. The model is useful as a tool to expand nurses' capabilities within a larger system. Importantly, the major stakeholders should understand the issue at hand, the purpose of the exercise, what the existing evidence and literature states, the results of the experiment and how

integrating and sustaining these efforts will lead to better outcomes. Through this framework, the university should understand its limitations, reevaluate existing processes, and, hopefully, implement evidence-based practice change in college athletics. These changes are expected to be driven by the model's focus on quality of care, sustained change, and increased patient engagement. Together these are expected to guide clinical decision making and transform clinical practice (Iowa Model Collaborative, 2017).

The Iowa model will be complemented by the health belief model (HBM) which is one of the most widely used models for understanding health behaviors. This framework will help predict if the student athletes' behavior changes will be successful over the long-term. A key concept of the HBM is the perceived susceptibility based of persons risk for behavior. This is important since risk of melanoma can be mitigating through proper UV protection and habits. The advantages to the HBM are changing behaviors in response to a diagnosed illness and adherence to medical regimens (Becker, 1974). Namely, an individual's perception of their susceptibility to a disease and the benefits from their actions taken increase the effectiveness of intervention.

Literature Review

Preceding the evidence-based practice project, a literature review was completed between January and March 2022. The literature review was performed using two search engines called PubMed and CINAHL. Key words used during the search were "sunscreen and athlete", "skin cancer and young adult", "college athlete and sun", and "melanoma and athlete". Then the literature was filtered by articles published within the past five years, English language, population, and quality of literature based off the Johns Hopkins Nursing Evidence-Based Practice Evidence Level and Quality Guide. A total of eight articles were chosen and critically appraised based on their content correlating with the evidence-based practice project. These included seven

systematic reviews of randomized controlled trials and one article that included a quasi-experimental design.

The aim of this evidence-based practice project was to focus on screening methods and sunscreen behaviors of university athletes. The literature review reinforced that ultraviolet radiation is the leading cause of skin cancer and young adults are at higher risk (Snyder et al., 2020). More specifically, outdoor sport athletes are at higher risk for ultraviolet radiation because they exceed the recommended exposure limits (Snyder et al., 2020). School based interventions and screening had positive impacts on behaviors and attitudes towards sunscreen (Reyes-Marcelino et al., 2021).

Two studies in particular highlighted the importance of educational health programs in improving the athletes' behaviors and attitudes towards sun exposure. One study showed that educational programs lead to decreases in precancerous skin lesions and skin cancer due to more frequent sunscreen application (Fernandez-Ruiz et al., 2022). The complementing study showed that, after sunscreen education intervention, athletes are more likely to use sunscreen regularly (Ally et al., 2018). These studies indicate that an appropriately structured educational program can have a meaningful impact on student athletes' health and reduce the incidence of sunburns and skin cancer.

According to Detert et al., (2015), Sun-Exposure Protection Index (SEPI) is an established instrument with validity and reliability. SEPI can be use in populations exposed to diverse sun settings to evaluate each individual's sun exposure and protection risk factors (Detert et al., 2015). SEPI consists of a two-part questionnaire with a total of 13 questions. The first section evaluates sun habits and protection and the second assesses readiness to improve sun protection. The first part of the questionnaire has a total of eight questions. The scoring is done using a five-point Likert

scale from zero to four with four being the high-risk behavior. Higher scores indicate a greater ultraviolet risk. Part two of the SEPI focuses on increasing sun protection habits. Higher scores for part two imply that the individual has lower motivation to change sun protection habits. Part two of the SEPI has an emphasis on transtheoretical model of behavior change. For these reasons, the SEPI was selected for the evidence-based practice project to be used as a screening tool.

Methods

Prior to initiating the evidence-based project, it was required to get both approval from the study sites Institutional Review Board (IRB) and a letter of support from the study sites athletic director. These were both obtained in the summer of 2022. Afterwards, the recruitment and enrollment efforts began with outreach to the women's softball head coach in September 2022. The goal was to ensure that the team was willing and able to participate in the project as well as to determine the timeline for the project. In October 2022, the student athletes from the softball team provided their consent and were enrolled into the project. All the student athletes met the inclusion criteria, which consisted of active membership on the women's softball team, no restrictions on applying sunscreen daily, and being 18-22 years old. The only exclusion criteria were having any allergies to ingredients in the sunscreen used for this project. No participants were excluded due to the exclusion criteria. In total, 23 participants were enrolled in the evidence-based project. Their ages and Fitzpatrick skin distribution are demonstrated in Figure 1 and Figure 2.

Once enrolled, athletes completed a Fitzpatrick Skin type quiz to enable subgroup analyses. Additionally, they completed a SEPI questionnaire, the two-part questionnaire and with a total of 13 questions. SEPI identifies both UV exposure risk and sun protective behaviors. Together these commonly used measurements provide a baseline for the participants and help identify a variety

of skin complexion and sun sensitivities. These forms were distributed by printed paper, unannounced and collected and stored in a secure location.

At the end of the initial meeting in October 2022, the primary intervention occurred. The intervention consisted of two parts. First, sun protection education materials were distributed to the participants with a 15-minute education session discussing melanoma as a medical condition, proper sunscreen habits to reduce melanoma risk, melanoma warning signs, and when to escalate a potential concern to a healthcare professional. Afterwards, student athletes were provided with sunscreen and instructed to apply it daily for 14 days to any exposed skin. After the 14-day intervention period, the DNP student met with the athletes and repeated the SEPI questionnaire to assess changes in sunscreen habits and use of sunscreen. Results were recorded in excel and all hardcopies were shredded.

Project Development and Timeline

The project idea was discussed and accepted by the study site and clinical faculty advisor in January 2022. Then the athletic director, approved the project in April 2022. The project was submitted for Institutional review board (IRB) approval in August 2022 and was subsequently approved in September 2022. This timeline permitted the intervention to be completed during preseason training in late September 2022 to early October 2023. The participants completed the 14-day intervention starting on September 23rd, 2022, and ending on October 7th, 2022. In October 2022, the project abstract was submitted and accepted to the Western Institute of Nursing (WIN) Conference. The project poster was presented at USD DNP Presentation Day on March 13th, 2023.

Ethical Considerations

While conducting this evidence-based research project, ethical deliberations were considered such as anonymity, voluntary participation, informed consent, confidentiality, and

allergies or skin reactions to sunscreen. Prior to any student athlete participation, consent forms were signed and all information regarding the project was disclosed. Participants understood that all questionnaires were completely anonymous, and their answers or results did not have any effect on school or athletics participation. Allergies or skin conditions were discussed in length and, if a participant chose to use different branding of sunscreen, it was deemed acceptable if the participant was using sunscreen as directed. All paper questionnaires were recorded in excel for data analyzation and then paper copies were shredded.

Cost-Benefit Analysis

Given the nature of this project, the costs incurred were limited to price of the spray and lotion sunscreen. The principal investigator provided the education materials and conducted the standardized screening, including the SEPI and Fitzpatrick skin tools, free of charge. The total cost of the spray and lotion sunscreen was \$305.85, which equates to \$13.30 for each of the 23 participants. While there are likely long-term benefits in terms of reduced risk of melanoma, this analysis considers the immediate impact of a once annual educational seminar and 2-week intervention. Therefore, the benefit is avoiding the \$150 cost of an annual dermatology appointment. With sufficient behavioral changes and regular reminders, this annual intervention may have additional long-term benefits that are difficult to quantify. Based on the \$13.30 cost of sunscreen per participant and the \$150 saving from avoiding an annual dermatology appointment, the project provides a \$11.28 annual cost savings per athlete.

Results

A total of 23 student athletes met the inclusion and exclusion criteria and opted to participate in the evidence-based research project. All the participants completed the pre and post questionnaires and zero participants dropped out for any reason. Prior to the intervention, 78% of

participants were either long-term sunscreen users or had recently begun using sunscreen. This category of users includes 52% of total participants who are long-term users and 26% who are recent users. There were no participants who had “never thought of using sunscreen”. After the intervention period, 92% of participants were sunscreen users. These favorable results were also seen via the SEPI scores. Prior to the 14-day intervention period, the average score of part 2 of the SEPI was 9.48. After the intervention, the average score decreased to 8.76. Each individual’s pre- and post-intervention SEPI Part 2 scores are shown in Figure 5. Importantly, every athlete’s score decreased by at least one point after intervention. The aggregate improvement of 0.76 points is highlighted in Figure 6.

Limitations

This evidence-based project had several limitations. The first limitation was the power of the study, which was not intended to provide a statistically significant result given the number of participants was limited to the roster of the softball team. Second, the sports team is a relatively homogenous population in terms of interest and diversity. The team is not a very diverse population as it relates to the Fitzpatrick skin score. The team mostly had Fitzpatrick skin scores of three or four and there no participants with a Fitzpatrick skin score of one. Third, the format of the educational materials was limited to printed flyers, and bookmarks. Other modalities that were not implemented in this project include online modules or cell phone reminders to apply sunscreen daily. Finally, the length of intervention period was limited to 14-days so the data gathered could not determine long-term trends. A longer intervention period such as three months would gather data to determine sunscreen use trends and behaviors changes.

Discussion and Sustainability

This project was intended to evaluate the implementation of education programs in college athletes, interdisciplinary relationships between athletic departments at the university, and the ability to change behaviors in young adults through education. While this project focused on a limited population of 23 similar individuals, future projects could implement similar interventions with a variety of sports teams or at different college campuses. Additionally, the duration of implementation could be expanded to evaluate the resiliency of the intervention and long-term behavioral changes.

This project promotes the interdisciplinary relationship between the school of nursing and the athletic department. There are numerous benefits that can be realized upon further collaboration among the schools within the university. As it relates to this specific project, other members of the nursing school could assist other university athletic teams. With the information gathered from this project and the previous principal investigator future principal investigator may increase the duration of the project and open the project to the entire athletic department. The athletic department currently supplies SPF 50 sunscreen in the athletic training room where athletes can apply sunscreen before practice or games. By standardizing screening and providing regular educational seminars, athletes can be reminded of the importance of sunscreen application before outdoor trainings. Athletic trainers and coaches are in a critical position with frequent contact with athletes to deliver sunscreen education and reminders to apply sunscreen. Standardize sunscreen education are time effective, relatively low in cost, and successful in cultivating sunscreen use in college athletes.

Implications for Practice

The results of this evidence-based practice project conjoined with existing research illustrates the importance and impact of standardized sunscreen educational programs. Behavioral changes in young adults can be achieved by sunscreen educational programs and frequent assessments of their skin cancer risks. Annual or preseason educational programs could be beneficial to both athletes and the athletic department as a whole. These programs can have a meaningful impact in the short-term as it relates to individual discomfort. Over the long-term, routine education and screening for collegiate athletes are effective ways to reduce their incidence of skin cancer and to promote the daily use of sunscreen.

Conclusions

College athletes are a vulnerable population for skin cancer because of their increased amount of UV exposure compared to the average college student. While this vulnerable population is at risk, the risk can be mitigated by taking proactive measurements including proper sunscreen use. Health care providers in primary care and university athletic departments are in key positions to provide the necessary intervention. This includes the initial assessment of risk, such as SEPI scores and the Fitzpatrick skin test, and provide regular sunscreen education. Evidence supports positive outcomes from the incorporation of educational tools and the use of standardize screening to improve increase sunscreen use in young adults. Importantly, these educational seminars can be seamlessly integrated into preseason training as shown through this project and regularly reinforced through flyers and reminders. These low-cost actions can have a major impact on the long-term health of these young student athletes and should be considered by the university.

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Figure 1

Self-reported athlete ages

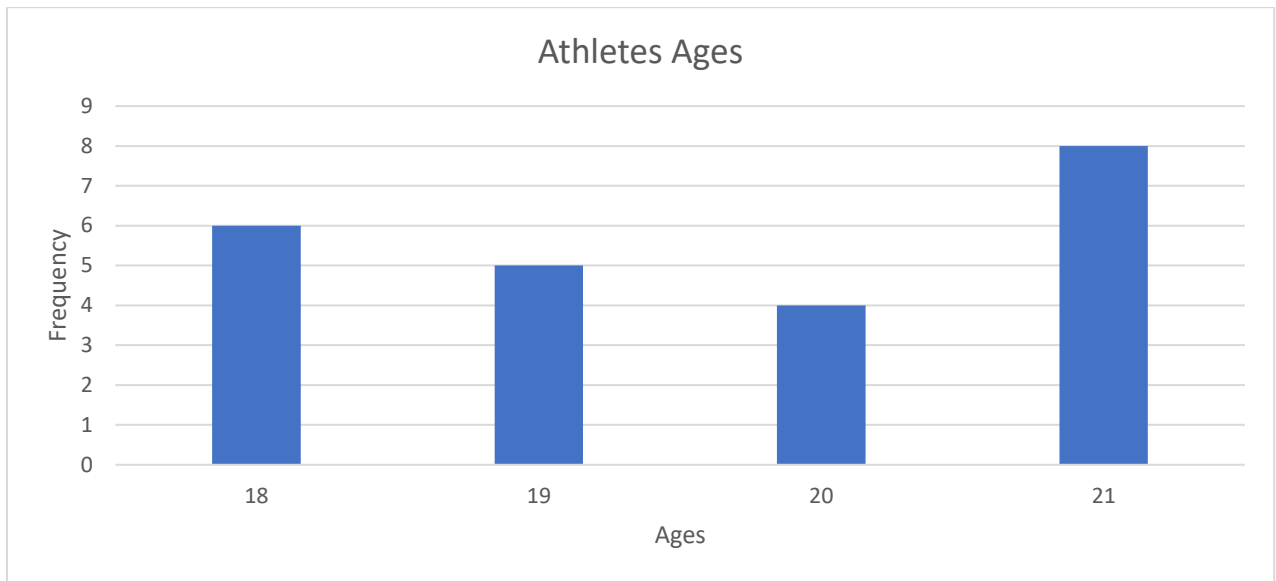


Figure 2

Self-reported athlete Fitzpatrick Skin Type

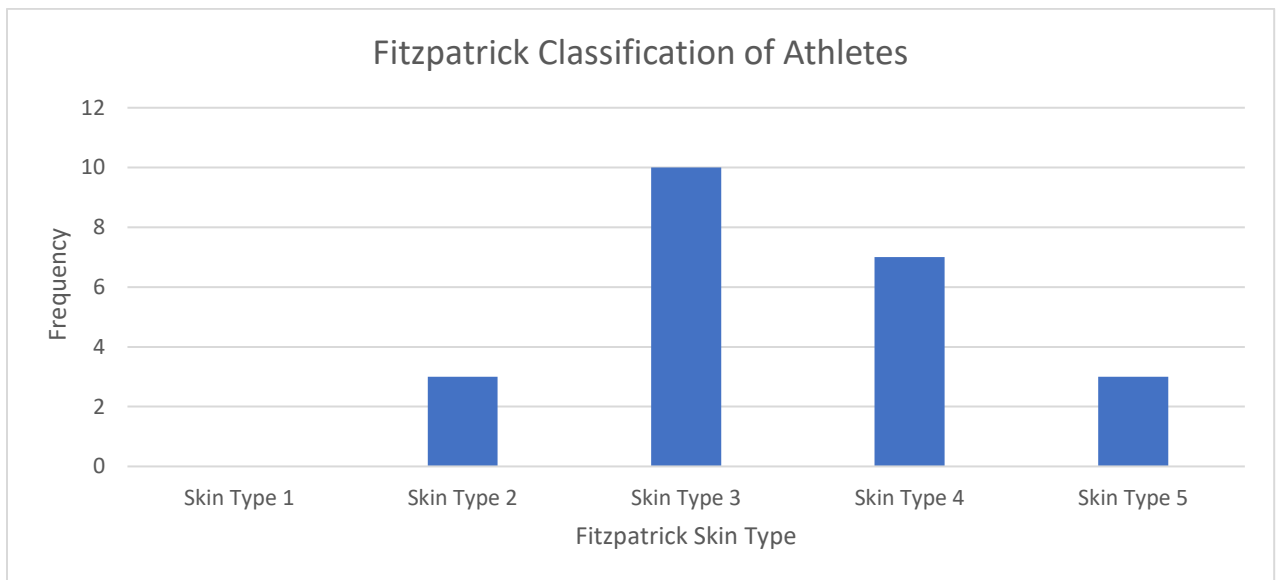


Figure 3

Frequency of participant sunscreen use before education and intervention period

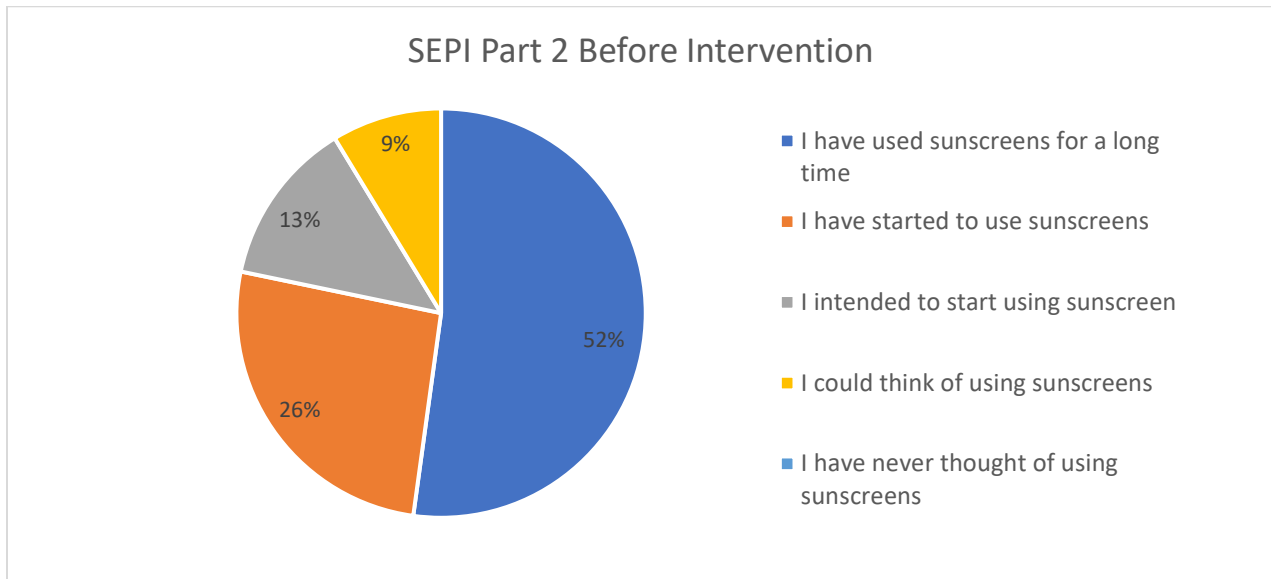


Figure 4

Frequency of participant sunscreen use after education and intervention period

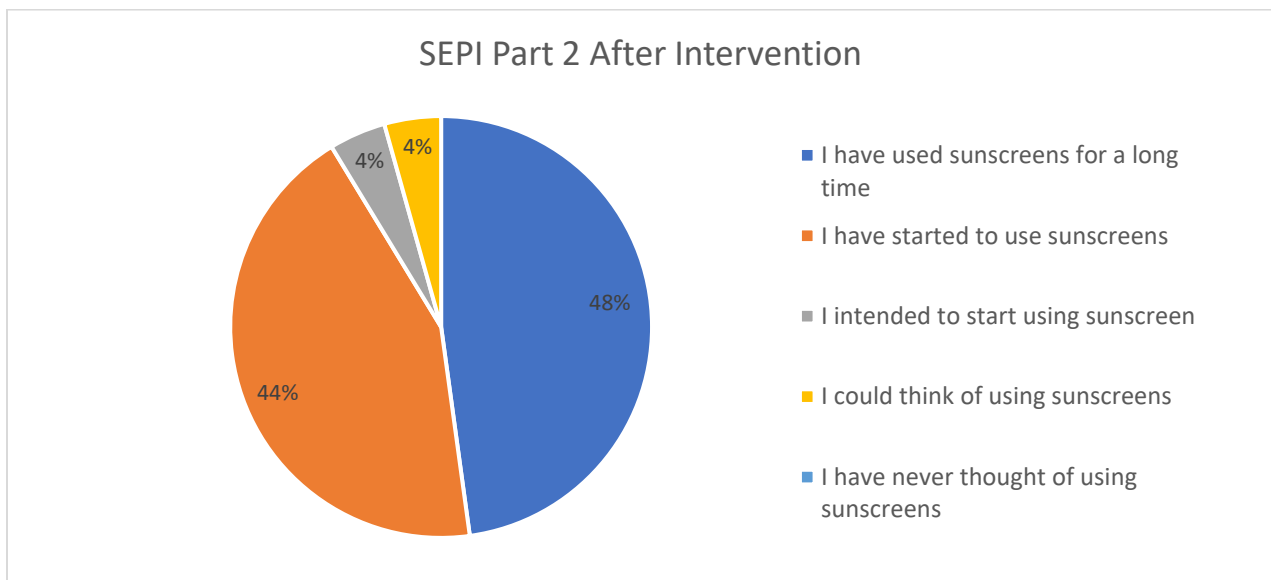


Figure 5

Participant scores on Part 2 of the SEPI before and after education and intervention

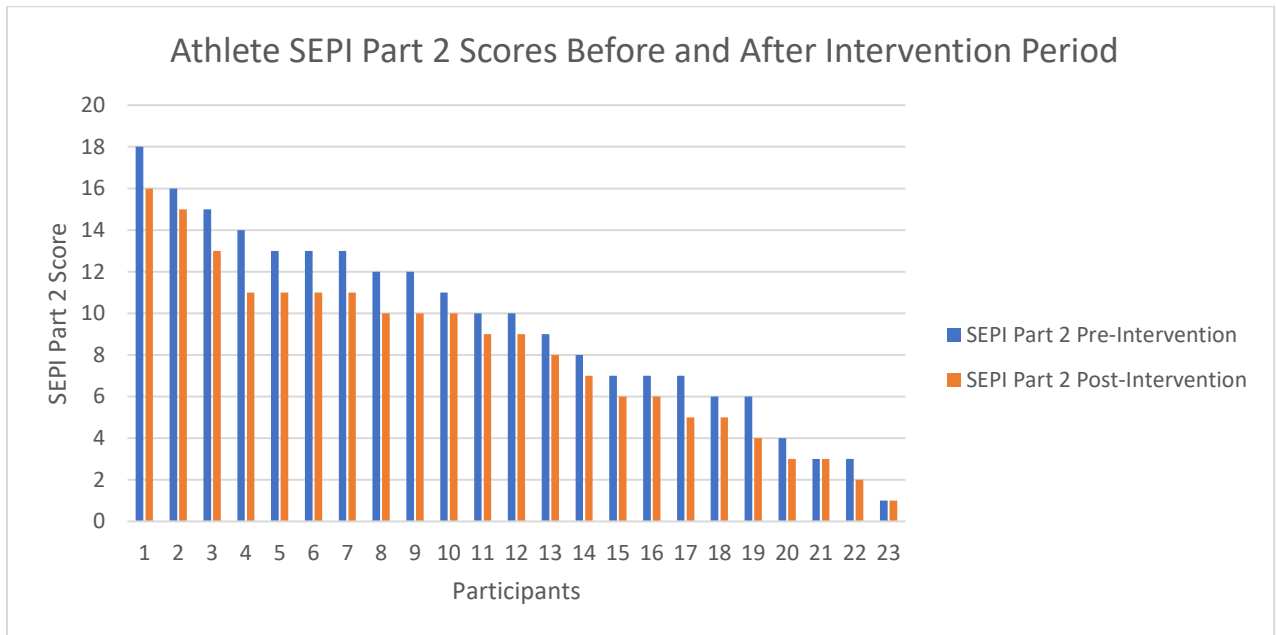


Figure 6

Average participant score on the SEPI Part 2 before and after education and intervention

