Sun Safety Education For Elementary School Students in Hawai‘i

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Desired Impact

This educational series is intended to improve sun safety awareness and practice amongst elementary school students in Hawai‘i, using materials reflective of the diverse cultures of this region.

Abstract

As global temperatures rise, sun safety measures are increasingly warranted. Although populations in Hawai‘i experience an average ultraviolet index of 9 (very high), we found that some schools' curricula lacked sun safety educational programs. Implementing preventive sun safety education is necessary to ensure that rates of disease-related damage from ultraviolet radiation (UVR) do not continue to rise with the next generation.

This pilot program aimed to prepare and evaluate a 1-hour educational presentation for fourth-grade students on the island of O‘ahu. Utilizing culturally diverse images, we compiled a PowerPoint presentation illustrating the long-term health effects of UVR damage, and the proper use of UV- protective measures such as sunscreen, hats, sunglasses, clothing, and shade-seeking behavior.

The first presentation was delivered on December 1st, 2023, to 70 4th-graders at an elementary school in Honolulu, Hawai‘i. Interactivity was stressed, and presenters observed students' responses to questions using a raise of hands. Although we did not officially measure, patterns were evident. For example, in pre-teaching, up to five students raised their hand to each question, with an accuracy of fifty percent at most. After reviewing appropriate protective gear, we again prompted students to identify which type of protective gear was missing in subsequent images. Post-teaching, an estimated seventy-five percent of the students raised their hands for each question, with an observed accuracy of one hundred percent when randomly selected to identify the missing protective gear.

Throughout the presentation, students were engaged; however, participation notably increased post-teaching, and by the end of the presentation, every student selected successfully identified the missing article of protective gear.

Based on these outcomes, we contend that sun safety education is potentially effective when delivered to fourth-grade students in Hawai’i via an interactive, representative PowerPoint, and a formal survey-based study is warranted to validate these observations.

Introduction

The scientific community agrees that global temperatures are rising[1]. Ultraviolet radiation (UVR) is a long-standing concern, especially in regions such as Hawai‘i that have a very high, average ultraviolet (UV) index[2]. Ultraviolet radiation can penetrate the skin, with some forms damaging the lower layers of the epidermis and it is reported that UVR-exposure during childhood correlates with increased lifetime risk of melanoma[3].

Despite above average UVR exposure in Hawai‘i, we found that some elementary schools‘ curricula lacked formal sun safety educational programs. Implementing preventive sun safety education is necessary to ensure that rates of disease-related damage from UVR do not rise in future generations.

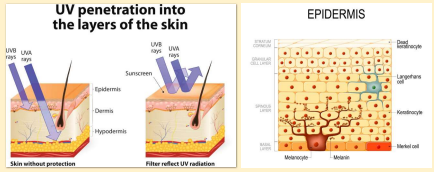

Figure 1: *Basics about UVR, mode of damage and skin structure were reviewed and discussed with students. Image Source: Hawai‘i Skin Cancer Coalition.*

Objective

This pilot was intended to increase knowledge of the health risks of excessive UVR for elementary students. Strategies to protect from UVR were also presented with the ultimate purpose of increasing elementary students’ knowledge base and promoting sun safety. Acknowledgement and representation of local cultures and diversity was of the utmost importance, in order to enhance receptivity, engagement and, therefore, effectiveness of the teaching session.

References

1). IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2391 pp. doi:10.1017/9781009157896

2). Colmenares LU, Coelho S, Miller SA, Boomer KB, Beer JZ. UV responses in Native Hawaiians and Pacific Islanders, and Asians residing in Hawai'i and in Maryland. Photodermatol Photoimmunol Photomed. 2013 Jun;29(3):121-31. doi: 10.1111/phpp.12035. PMID: 23651272; PMCID: PMC4972937.

3). Skin Cancer Prevention (PDQ®). National Cancer Institute. Published December 8, 2023. https://www.cancer.gov/types/skin/hp/skin-prevention-pdq#_172

4). Bandura A. On the Functional Properties of Perceived Self-Efficacy Revisited. *Journal of Management*. 2011;38(1):9-44. doi:10.1177/0149206311410606

Images

Bella Noir Beauty. Dark Skin Does Burn. https://www.bellanoirbeauty.com/dark-skin-does-sunburn-my-trip-to-cancun/. June 3, 2015. Accessed January 28, 2024. (used with permission)

Hawai‘i Skin Cancer Coalition (used with permission)

Barney Moss. Somerset House Splash 1. Flickr. https://www.flickr.com/photos/barneymoss/14406537733/ May 31, 2014. Accessed January 30, 2024. https://creativecommons.org/licenses/by/4.0

JmVaras. Large Pterygium. Wikimedia Commons. https://commons.wikimedia.org/w/index.php?title=File:Large_Pterygium.jpg&oldid=600464389. October 20, 2021. Retrieved January 29, 2024

Memorial Sloan Kettering Cancer Center. Malignant Melanoma. International Skin Imaging Collaboration.https://gallery.isic-archive.com. Accessed January 28, 2024. https://creativecommons.org/licenses/by/4.0

Methods

Schools were randomly contacted by email to offer the presentation. The pilot was delivered via a PowerPoint informed by expert opinion and review. Three medical students shared images describing the damage that UVR can cause to the body without protection. Emphasis was placed on representing all skin complexions within the presentation, which is especially important given the diversity of our audience and community in Hawai‘i.

According to the social cognitive theory of Bandura (2012), children’s self-efficacy for behavioral change and learning is enhanced when modeled through peers[4]. This theoretical framework was utilized during the second half of the presentation, as appropriate protective clothing, gear, and guidelines for sunscreen application were reviewed. Students were then presented with scenarios of underprotected, children, adolescents, and adults of differing complexions and asked to identify which protective item was lacking. Sunscreen was noted as having been applied.

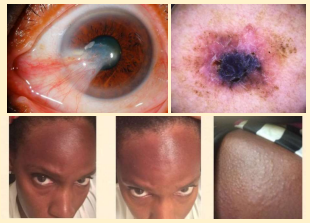

Figure 2: *Examples of UVR damage were displayed and discussed with students using inclusive images.*

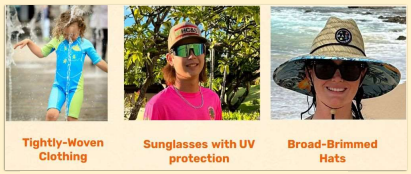

Figure 3: *Examples of protective clothing were presented and reviewed with students.*

Figure 4: *Students were presented with images displaying either under or appropriately protected individuals of differing complexions and asked to identify the missing item.*

Results

Before the teaching session no more than 5 of the 70 students participated by raising their hand to each question.

After the teaching session the proportion of raised hands increased dramatically, and was closer to 75% of the 70 students.

Pre-teaching, the students who raised their hand and were selected answered correctly no greater than 50% of the time.

Post-teaching, the selected student answered correctly 100% of the time.

Conclusion

Based on the observations of presenters, we postulate that this sun safety education pilot was successful in engaging fourth-grade students to learn about sun safety, including consequences of unprotected exposure and strategies for protection. Additionally, the presentation successfully delivered age-appropriate information with a focus on representation to reflect the diverse student population of Hawai‘i. The apparent trends of this pilot presentation strongly support the continuation of the sun safety education program. Further presentations with survey-based data collection should be done to validate the pilot results.

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