Ask the Keiki: Perceived Factors that Affect Asthma Among Adolescents from the Wai‘anae Coast Using Photovoice

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Abstract

Hawai‘i has among the highest childhood asthma prevalence compared to all other states in the United States. Native Hawaiian children have a higher prevalence of asthma compared other racial/ethnic groups in the state. Photovoice is a method in community-based participatory research that enables participants to use photos to express themselves and advocate on behalf of their community. In this study, students from the Wai‘anae Coast used Photovoice to identify perceived factors that affect asthma management. Seven students, ages 14 and 18, with self-reported asthma met virtually, with facilitators, after school once a week for four weeks. Students identified eight factors as positively or negatively impacting the students’ asthma and explained how these factors influence their health. The Photovoice results provided an in-depth understanding on the role a student’s culture and environment plays in asthma management. Continued efforts to develop asthma education programs tailored to address the specific factors that youth identify as impacting their asthma may be more effective in reducing asthma disparities. Future research should expand on the key themes identified in this study and include continued advocacy efforts among students to improve asthma-related outcomes in this community.

Keywords

Photovoice, participatory action research, community-based participatory research, adolescents, school-age children, asthma, asthma triggers, Native Hawaiian

Abbreviations and Acronyms

ACT = Asthma Control Test
COVID-19 = Coronavirus disease 2019
IRB = Institutional Review Board
SBHCs = School-based health centers
SBHEs = School-based health educators
WCCHC = Waianae Coast Comprehensive Health Center

Introduction

Hawai‘i has among the highest prevalence of childhood asthma compared to all other states in the United States.[1] In 2016, asthma affected a quarter (25.3%) of Hawai‘i’s children under the age of 18.[2] However, Native Hawaiian children have the highest asthma prevalence compared to other major racial/ethnic groups in the state.[3] In 2012, more than half of Hawai‘i’s children diagnosed with asthma were Native Hawaiian, while the state population prevalence of Native Hawaiian children less than 18 years old is 34.2%.[4] Therefore, compared to other racial/ethnic groups, Native Hawaiian children and their families will likely experience the greatest burden of asthma related outcomes.

Asthma prevalence among children also vary based on area of residence in Hawai‘i. In O‘ahu, children residing in the Nānākuli/Wai‘anae area are more likely to suffer from asthma than children living in other areas throughout the island.[5] For example, the prevalence of childhood asthma was 17.5% in Nānākuli/Wai‘anae compared to 6.9% in the Kaimukī/Pālolo/Waikīkī area of O‘ahu.[5]

There is no cure for asthma, but it is a treatable disease. However, limited studies have examined asthma management from the child’s perspective.[6–8] This knowledge is invaluable since children have autonomy in health decisions and are often responsible for managing their asthma.[8,9] Therefore, a better understanding of managing and preventing asthma triggers and exacerbations are needed from the child and adolescent’s perspective, especially from populations with asthma-related disparities. Additionally, there is lack of research that explores how cultural values could have an impact on asthma management among children of Native Hawaiian ancestry. Traditionally, Native Hawaiian views of health include a balance between spirituality, environment (ie, land), and people and poor health was a result of an imbalance in the domains.[10] Such information is important to address health disparities in a sustainable way from a strength-based approach.

The objective of this study was to identify supports and barriers to managing childhood asthma from the perspective of

children who reside on the Waiʻanae Coast of Oʻahu in the state of Hawaiʻi. The Waiʻanae Coast communities of Waiʻanae and Nānākuli was selected because of the disproportionate rate of asthma among children. A large percentage of residents in these communities are also Native Hawaiian.

Methods

Study Design

Photovoice is a form of community-based participatory research that is helpful for promoting transformative change.[11,12] Photovoice enables participants to use photos to express their concerns and empowers socially marginalized groups to advocate for themselves and their community.[11,12] The study followed Wang's suggested Photovoice procedures for researchers to: (1) select and recruit a target audience of community leaders; (2) recruit Photovoice participants; (3) introduce the Photovoice methodology and facilitate group discussion; (4) obtain informed consent; (5) determine a theme for photos; (6) distribute cameras and review instruction; (7) provide time to take photos; (8) discuss and analyze photos; and (9) develop a plan for disseminating photos and findings with community leaders and members.[11] The students were also administered the Asthma Control Test (ACT) to assess the student's asthma severity and control.[13]

Recruitment

This study obtained approval by the Waiʻanae Coast Comprehensive Health Center (WCCHC) Institutional Review Board (IRB). Students in grades 6th to 12th who were a part of the WCCHC school-based health centers (SBHCs) student internship program(s) that are led by school-based health educators (SBHEs). Students who self-reported as having asthma were encouraged to participate. Informational packets were provided to all participating interns. Students submitted a signed parental consent and student assent to the SBHEs prior to the first session.

Enrollment

The Photovoice group met once a week for 4 weeks between February and March 2021. Due to the coronavirus disease 2019 (COVID-19) pandemic, the Photovoice group met virtually via Zoom for 1.5 hours during their internship time. Each student received a digital camera and an e-gift card for their commitment and participation.[14]

Participants

The Photovoice group included 3 group facilitators (2 SBHEs and the OU) and 7 students. All students attended at least 3 sessions, with 3 students missing 1 session. The SBHEs assisted the first author by facilitating the group discussions by mitigating power dynamics and creating a safe place for each student's voice to be heard and valued.

The 7 students identified as Native Hawaiian/Pacific Islander and were majority female (71%) between the ages of 14 to 18 years. The ACT indicated 71% had well-controlled asthma. All students reported they had missed at least 1 day of school per month pre-COVID due to their asthma.

Orientation and Data Collection

Table 1 outlines the details of each session. The first week covered background information, study relevance and future implications, Photovoice methodology, basic photography instruction, ethics, power, and risks. The research team provided all students with a digital camera but also allowed personal cell phones to capture photos. The students agreed on the following research questions: (1) What makes it easy to breathe? and (2) What makes it hard/difficult to breathe? Over the following 3 weeks, the students collected data by taking photographs that responded to the prompts. Data also included the student's written and verbal reflections on photographs and experiences.

Analysis

Wang's "Participatory Analysis" method was used for group analysis.[11] The method is comprised of 3 steps: (1) selecting; (2) contextualizing; and (3) codifying. At the beginning of sessions 2 and 3, students selected 2 to 4 photographs that they had taken the previous week. Each student contextualized their photographs, explained why the photograph was taken, and what the photograph represented. The Photovoice group collectively identified major themes (ie, codifying) in the photographs and used the technique known as SHOWeD to discuss the photos' significance. The mnemonic SHOWeD consists of 5 questions: S: What do you See here?; H: What is really Happening here?; O: How does this relate to Our lives?; W: Why does this situation, concern, or strength exist?; D: What can we Do about it?".[11] The group facilitators assured the analysis was a collective process and that the students agreed to the final themes.

Advocacy/Dissemination

Following the data collection and analysis, the Photovoice group decided to share their results by disseminating their photographs to family members, community advisory board members, the WCCHC IRB, and WCCHC Pediatricians. Additionally, upon completion of the study, the Photovoice group held a videoconference presentation with other community stakeholders, including researchers and Hawaiʻi Department of Health staff and administrators, who are involved in pulmonary research, healthcare, and chronic disease management.

Table 1. Timeline and Description of the 4 Photovoice Sessions		
Session	**Activities**	**Outcomes**
1: Orientation meeting	• Answer demographic questionnaire and all survey tools • Introduce research questions for study • Discuss Photovoice methods • Distribute cameras, journals, timelines, and guidelines for photo-taking • Provide instructions regarding ethical camera use • Introduce SHOWeD mnemonic for writing narratives/captions	• Increase understanding among students about the prompts for taking photos • Increase knowledge and skills related to using a camera and tracking photos taken based on the prompts
2: Review of photographs that represent supports and barriers	• Upload photographs to Jamboard • Instruct students in selecting 1-2 photos taken • Instruct students to share selected photos using the SHOWeD mnemonic for creating narratives/captions • Collectively identify the most significant supports and barriers among photos shared • Discuss potential audience for final session	• Identification of themes • Identification of potential audience members for final session
3: Dissemination product	• Encourage and assist students in completing their dissemination product • Further discuss audience for final session	• Complete dissemination product • Finalize audience for final session
4: Dissemination of findings to stakeholders	• Facilitate presentation of dissemination product by students	• Present findings to stakeholders

Results

Of the 19 photographs reviewed, the Photovoice group agreed upon 8 dominant themes. The 4 support themes were *ʻĀina* (land), safe haven, alternative remedies, and communtiy support. The 4 barrier themes for asthma triggers were physical activity, foods, environmental, and emotional.

Supports

ʻĀina. Most students identified ʻāina as a factor that helps their asthma. Five of the students discussed that being outside has a calming effect, which helps their breathing. Students identified several activities that helped relieve stress including going to the beach, looking at the sky, hiking, or sitting in their backyard to get fresh air. One student highlighted the connection between spirituality and ʻāina with their asthma: "Through spiritual connection to ʻāina, I find that I breathe easier. Though it seems in some ways counterintuitive to go outside when you are having issues with asthma, in my case it makes perfect sense… and through this process and our group discussions, it seems that this is a fairly common sentiment. I find peace in being outside: at the beach, hiking…there is something about being in ʻāina, being joined together with ʻāina that helps me become more at peace with the world around me, making it easier for me to deal with challenges that I face, such as anxiety and asthma" (Figure 1).

Figure 1. ʻĀina, Spirituality and Pilina: Spiritual Connection to ʻĀina Looking Back Towards Waiʻanae from Kaʻena, Salt Spray. The photograph shows the salt spray at Keawaula, which is thought to help those with asthma. (Source: Youth photographer, age 15.)

Safe haven. Three students discussed the importance of a sanctuary to help clear their minds and calm their body. Students described the various safe havens as specific locations such their bedroom but included pets and spiritual practices like meditation as additional supports. One student shared a photograph of the bedroom: "I took a picture of my bed, not because my bed is what helps but more of what my bed represents which is comfort. When I have my asthma attacks, I always cry, I never knew why but I think it's honestly because of fear, just the sudden impact of something is wrong…I've learned however from these moments that what helps me is having someone there while also giving me space because I am freaking out. Having someone there gives me the security I need that if I get worse and just having that space to breathe helps me calm down and that I'm okay" (Figure 2). Another student shared: "Meditation has been a huge thing for me lately because I know I need to take breaks and focus on myself more. When I'm meditating my mind is clear and my body is calm, so my asthma isn't bothering me and I'm at peace in every aspect of myself. My asthma bothers me a lot, but once I meditate, I really don't even think about it" (Figure 3).

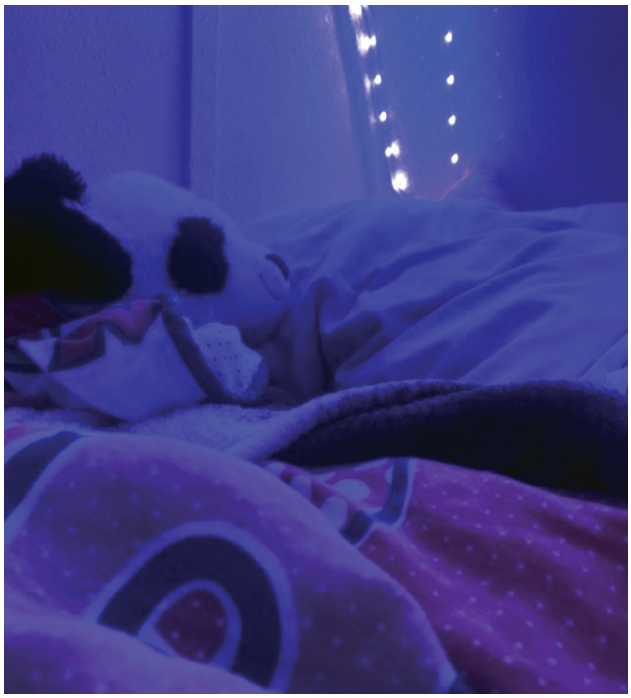

Figure 2. The photograph portrays the student's bedroom, which represents their safe haven. (Source: Youth photographer, age 14.)

Alternative remedies. The use of asthma medication and natural products were important factors that improve their breathing. A student shared a photograph of a tea tree oil product saying: "My aunt has introduced Melaleuca to my family, and it has really help with my asthma…I use it to clean my room and bathroom because it makes it easier to breath" (Figure 4). Another student photographed the use of a nebulizer and shared there are other medical instruments for asthma "that help combat it", but the most effective is their nebulizer.

Community support. The importance of community support was referenced by discussing how a strong supportive community could help asthma management when members are "motivated to fight to protect their children" (Figure 5).

Barriers

Physical activity triggers. Two students discussed the impact of physical activity on triggering their asthma. Both students described their experience as a "weight" and being "out of breath" when exercising, but wanting to participate in physical activities. For example, 1 student said: "I'm not sure if this sounds invalid but I've always struggled to keep up with normal exercising because of my asthma. I was always the last person to finish a lap or a simple exercise because I

Figure 3. The photograph portrays the student's meditation practice, which represents their safe haven. (Source: Youth photographer, age 15.)

Figure 4. The photograph portrays the Tough and Tender product that uses Melaleuca as an alternative remedy. (Source: Youth photographer, age 17.)

Figure 5. The photograph portrays a supportive community at a local PVT expansion meeting. (Source: Youth photographer, age 15.)

Figure 6. The photograph portrays the student's running shoes, which represents their physical activity trigger. (Source: Youth photographer, age 14.)

ran out of breath before I finished it or I had to use my inhaler in the middle of doing a workout which is so embarrassing in front of all of my classmates. I've always been embarrassed to work out in front of people because of my asthma" (Figure 6). Furthermore, another student shared about their competitive nature, but "get a constant slap back to reality when I have to stop because I'm already out of breath. My asthma has caused me to have a few attacks and has seemingly just slowed me down when I just want to run" (Figure 7).

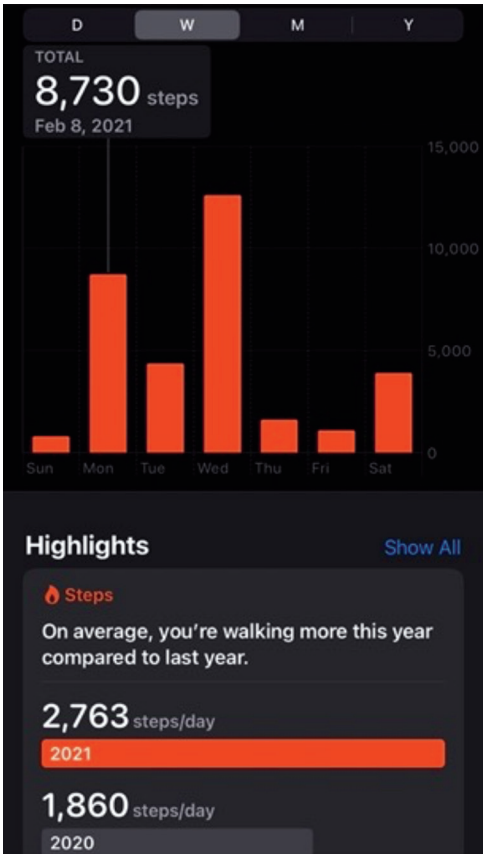

Figure 7. The photograph represents how physical activity triggers this student's asthma. (Source: Youth photographer, age 15.)

Food triggers. One student shared that certain foods negatively impacts their asthma. This student loves chocolate, but the dairy causes a "really tight feeling in my lungs, I'm not exactly sure of the reason. I enjoy eating it and honestly, I wish that it didn't have as much of a negative effect on my health as it does."

Environmental triggers. Majority of students discussed various environmental factors that caused them to have asthma attacks. Students expressed that hot, dusty places (indoor or outdoor) make them feel like they are "suffocating" and "struggle to breathe." However, 1 student mentioned that it is always hot in Nānākuli and the weather changes often. The student further stated: "It's super hot outside of my house so I hate going outside because I know my asthma will flare up really bad. The day after it rains is always really bad because it's so humid and the air is really thick and it gets really hard to breathe. That's why I'd rather just stay in my room most of the time" (Figure 8). Additionally, other students expressed asthma exacerbations with changes in the weather and various plants that grow on the Waiʻanae Coast. For example, 1 student said: "It is no secret that Hawaiʻi has a great deal of invasive

species in the ocean, on the land, and in our minds...when these plants flourish and seed, especially the California and Guinea grass, my family notices an unpleasant increase in unpleasant asthma" (Figure 9).

Figure 8. The photograph represents how the weather, particularly the heat in Nānākuli can increase asthma attacks. (Source: Youth photographer, age 15.)

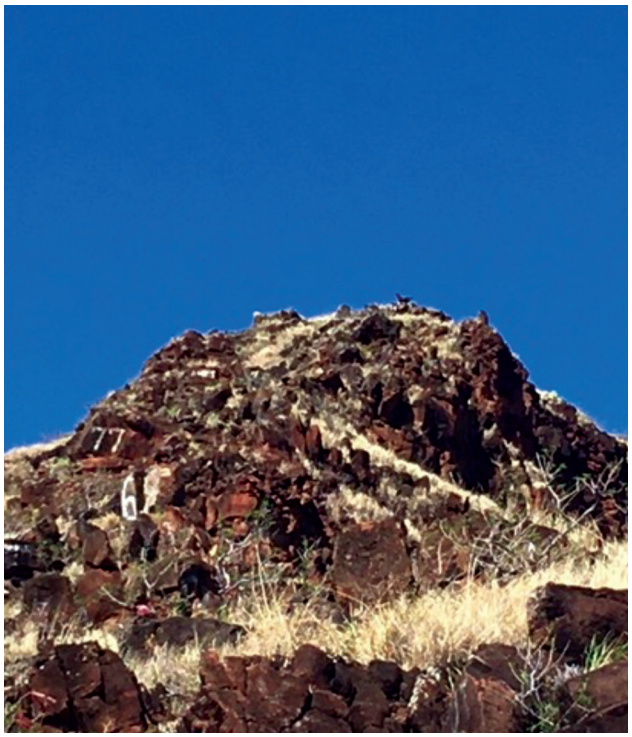

Figure 9. The photograph shows the invasive species of the California and Guinea grasslocated on the mountain of Kamaileʻunu in Waiʻanae. (Source: Youth photographer, age 15.)

Emotional. Two students shared how emotions like feeling anxious or being overwhelmed can make it more difficult to breathe. One student shared that "meetings and situations" where there are "put in a position of responsibility and am in public" makes their asthma worse. This student shared they love people, but "figuring out how to deal with them is a little challenging," therefore adding to the emotional stress. Another student discussed the importance of family stating: "When I think about my family and how far we've come- how far we've drifted, my breathing picks up, and I can feel myself spiraling. I love them with everything in me. It troubles me to know that perhaps they won't always be there in the future" (Figure 10).

Figure 10. The photograph shows the student's family and the strong emotional connection the student shares with them. (Source: Youth photographer, age 17.)

Discussion

This study used Photovoice methodology to empower and engage students in research on positive and negative factors that affect their asthma. To authors' knowledge, this is the first Photovoice study that resulted in student-identified supports and barriers for asthma management. The study also provided a better understanding of the students' experiences when managing their asthma symptoms, especially within the context of Hawaiʻi, the specific community where they reside,

and their Native Hawaiian culture. Findings support childhood asthma management is multifactorial and involves individual, environmental, and community aspects that may be important to the control of their symptoms.[15,16]

There were 8 significant factors that were identified from the students' photographs and group discussions. Students reported ʻāina, safe havens, alternative remedies, and a supportive community as significant supports that helped control their asthma symptoms. The concept of ʻāina is at the center of Native Hawaiian culture. There is a reciprocal relationship between ʻāina and people which contributes to their health.[17] Therefore, Native Hawaiians value mālama ʻāina (land stewardship, caring for the land) and practices that foster connections to ʻāina as a critical indicator of health.[17] The role that ʻāina plays for improving asthma control among Native Hawaiian children highlights prior findings that ʻāina is health (ie, maintaining healthy connections to ʻāina leads to healthy individuals).[17]

Students felt finding a safe haven, which could be a place, pet, or practice, where they can be alone and find comfort improved their breathing. For these students, a safe haven provides comfort and helps them deal with their asthma and aligns with research that shows that relaxation strategies reduce stress and may be associated with improvements in pulmonary function.[18,19] It is well-known that medication adherence reduces asthma exacerbations.[16,20] However, the use of natural products referenced by the students as an alternative or supplemental remedy for asthma treatment is less clear. A recently published literature review found all-natural products (eg, plant-based) improved asthma symptoms and could be used as a complementary treatment option.[21] Furthermore, students reported the importance of community involvement and support in addressing childhood asthma. Engaging community members in the planning and implementation process of public health efforts is invaluable when addressing community needs.[22]

Students identified 4 well-known triggers that perceived to negatively impact asthma symptoms. These asthma triggers included strenuous exercise, foods, environmental triggers (eg, dust and hotter temperatures), and emotional stressors. While exercise has been found to improve asthma control in a prior study, 2 students reported participation in sports and recreational activities as a barrier.[7] Students also recognized specific foods, like chocolate, can trigger asthma symptoms. This finding is consistent with studies that found diets high in dairy and sweets resulted in greater asthma symptoms.[23,24] Dust and plant allergens are well-established environmental triggers, but the negative impacts on asthma symptoms with increases in the ambient temperature is less reported. Two recent studies have shown similar findings that hotter ambient temperatures are more likely to cause asthma exacerbations among children.[25,26]

Limitations

This study was not without limitations. The study's processes may be transferable to other settings and populations based on the Photovoice methodology, but the findings may not be generalizable and might be specific to factors found within this community (eg, cultural beliefs, types of invasive species, and hotter climate temperatures). The intent of this Photovoice study was to gather data from a small number of students from the Waiʻanae Coast on their perspectives on factors that affect their asthma. The Waiʻanae Coast is unique in its geographic location, racial/ethnic makeup, and the social, political, and economic challenges this community experiences.[27] This qualitative study is important in identifying culturally grounded interventions that address the asthma needs of children in this community. The number of Photovoice sessions was limited to 4 sessions via video teleconferencing. Findings may have resulted in different themes and subthemes if students were allotted more time to answer the research questions or if the sessions had been done in-person.

Implications for Schools and School Health Services

This study provided a better understanding of the individual factors that help or trigger asthma management among Native Hawaiian students from the Waiʻanae Coast. The experiences shared by this Photovoice group establishes a foundation for pediatric providers, SBHEs, and public health researchers. Asthma education needs to be provided to students with asthma as well as faculty and personnel at the schools. This research supports the need for teachers and staff to collaborate with students to identify and implement strategies that support asthma control. Identifying when a student needs a break to be alone and encourage the use of supports that improve asthma symptoms (eg, ʻāina, safe haven, alternative remedies) may be effective in improving asthma-related outcomes, including school attendance. Additionally, educating students that the SBHCs and SBHEs are possible safe havens on campus.

Most students emphasized the important role ʻāina plays in their asthma management. Further studies to explore how to best integrate the concept of aina, and other indigenous practices, in interventions for Native Hawaiian students with asthma should be considered. For example, aquaponics systems and community gardens are ways students can connect with ʻāina and have shown positive health outcomes.[28–31]

This Photovoice study represents a small step toward transformative change in reducing asthma-related outcomes among students with asthma. Continued efforts are needed to create policy-level changes. A community-academic asthma group that includes the WCCHC, students with asthma, community board

members, and faculty at the schools may be effective in meeting the needs of the community. Partnerships with state-level representatives, public health organizations, and community-based organizations could help in identifying resources to implement asthma education programs for the Wai‘anae Coast community.

Conclusion

Youth from the Wai‘anae Coast continue to have disproportionate high proportion of asthma and poorer asthma-related outcomes. Photovoice was effective in helping students identify unique factors that affect their asthma management. It is also imperative that efforts are made to identify and address these unique factors that may be involved in improving asthma control among Native Hawaiian children. Future research is needed to further expand on the key themes identified in this study as well as continued advocacy efforts among students to improve asthma related outcomes in this community. Research should include more sessions, be conducted in-person, and include students who reside from the Wai‘anae Coast but are not a part of the internship program.

Conflict of Interest

None of the authors identify any conflict of interest.

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