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Hawaiʻi Journal of Health & Social Welfare Instructions for Authors of Research Articles

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Original articles are usually research-related, quantitative or qualitative papers. Research articles are limited to 3000 words. Reviews summarize the literature, address current practice or issues within the medical or public health communities, and are intended to promote a discussion of different viewpoints. Reviews are limited to 3000 words.

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History:

In 1941, a journal then called The Hawaiʻi Medical Journal was founded by the Hawaiʻi Medical Association (HMA). The HMA had been incorporated in 1856 under the Hawaiian monarchy. In 2008, a separate journal called the Hawaiʻi Journal of Public Health was established by a collaborative effort between the Hawaiʻi State Department of Health and the University of Hawaiʻi at Mānoa Office of Public Health Studies. In 2012, these two journals merged to form the Hawaiʻi Journal of Medicine & Public Health, and this journal continued to be supported by the Hawaiʻi State Department of Health and the John A. Burns School of Medicine.

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Impact Deceleration Differences on Natural Grass Versus Synthetic Turf High School Football Fields

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Abstract

American football has the highest rate of concussions in United States high school sports. Within American football, impact against the playing surface is the second-most common mechanism of injury. The objective of this study was to determine if there is a difference in impact deceleration between natural grass and synthetic turf high school football fields. A Century Body Opponent Bag (BOB) manikin was equipped with a Riddell football helmet and 3 accelerometers were placed on the forehead, apex of the head, and right ear. The manikin was dropped from a stationary position onto its front, back, and left side onto natural grass (n = 10) and synthetic turf (n = 9) outdoor football fields owned and maintained by public and private institutions on O'ahu, Hawai'i. Data was collected on 1,710 total drops. All accelerometers in forward and backward falls, and 1 accelerometer in side falls showed significantly greater impact deceleration on synthetic turf compared to the natural grass surfaces ($P < .05$). The results of this study provide evidence-based rationale to inform youth sports policies, particularly those aimed at injury prevention through safer playing environments and equipment.

Keywords

Sports, football, concussions, biomechanics, prevention, high school, pediatrics

Introduction

American football accounts for the majority of concussions in US high school sports.[1-3] Head contact with the playing surface accounts for up to 10.2% of concussions, making it the second-most common mechanism of concussion following player-to-player head contact.[1–3] The risk of injury due to head-to-surface contact is exacerbated at the youth level, where up to 21% of concussions in children aged 5-9 from 1990 to 2009 occurred from surface impacts during play.[4] This has been attributed to the "bobblehead" effect, where disproportionately large head size and relatively underdeveloped neck musculature limits young athletes' ability to brace their head in a fall. Concussions in young, developing athletes have been shown to be more damaging than in the adult brains, with significant negative impacts on attention and concentration and negative associations with academic performance.[5] Field surface hardness directly affects how much force is transferred to the brain and may be correlated to concussion incidence and severity.

While synthetic turf fields are increasing in popularity due to low maintenance costs, durability, and multi-use potential, synthetic turf has been causally linked to more ankle and knee injuries, with inconclusive data on concussions.[6-18] One proposed cause of these higher rates of injury is that turf exhibits increased grip and traction during changes in position while natural grass fields would break apart and reduce ligamentous strain.[6] Well-maintained synthetic turf fields can perform similarly to natural grass fields, but a multitude of factors such as weather and infill compaction with use can cause deterioration of their protective effects.[19,20] These factors may be exacerbated in high school sports, where field maintenance resources may be less available or of lower quality than those of professional sports stadiums. It has been suggested by research on athletes of many levels, from high school to professional American football, that these differential injury rates may result from differential surface hardness.[14-16] Previous studies have been observational, examining differences in injury rates or testing field materials at collegiate or national level competition. To the authors' knowledge, there has been limited reporting on the differences of playing surfaces at the high-school level where there is often a higher degree of variability in field conditions and maintenance. The objective of this study was to determine if there is a difference in impact deceleration between natural grass and synthetic turf high school football fields.

Methods

This experiment was conducted at 10 natural grass and 9 synthetic turf high school football fields on O'ahu, Hawai'i (**Table 1**). Field testing for each individual field was completed within a single day. Testing was conducted in dry conditions. ADXL326 - 5V ready triaxial accelerometers (Analog Devices, Inc., Norwood, MA) were placed on the forehead, apex of the head, and right ear of a Century Body Opponent Bag (BOB®) manikin (Century, LLC, Oklahoma City, OK). A previously used and unmodified Riddell 2012 Victor Youth XL football helmet (Riddell, Rosemont, IL) was secured onto the head of the manikin over the accelerometers. The head and torso manikin was a martial arts and boxing manikin that mounts onto a weighted base via a hollow plastic tube (**Figure 1**). The weighted base was disconnected from the manikin and it was not included in the manikin drops.

The 1.13-meter-tall manikin weighing 10 kg was dropped from a stationary position from the edge of a folding table at a height of 60 cm onto its front, back, and left side. Each of these drops was conducted 10 times at the hashmarks of the 40-yard line, 20-yard line, and endzone to account for the effect of unequal use of certain field areas (90 total drops at each field). Falls that did not result in the intended impact as ascertained visually and through outlier sensor data were redone.

The primary measure of this experiment was impact deceleration, where a high impact deceleration indicates low impact attenuation and a harder surface. From this point forward, surface hardness or impact force will be used interchangeably with impact deceleration, where high impact deceleration is equivalent to a harder surface or higher impact force and low impact deceleration is equivalent to a softer surface and lower impact force. Each accelerometer recorded linear acceleration (in g units, 1 g = 9.8 meters/second^2) experienced by the manikin in x, y, and z vectors. Continuous data from each accelerometer was recorded onto a high-speed micro secure digital card (SD card) at a rate of 300 readings per second. This data was transferred to a Microsoft Excel Version 16.0 spreadsheet (Microsoft Corporation, Redmond, WA) in which a macro was written to identify the point of maximum impact force and graph the data points prior to and following this point. The net deceleration on impact for each accelerometer was calculated as a net vector from the maximal change in x, y, and z vectors which coincided with the moment of impact.

Results were expressed in mean values with 95% confidence intervals [95% CI] for each accelerometer and drop type, calculated using Microsoft Excel. Significant differences with

Figure 1. Image of Manikin Used in the Study
Accelerometer chips were attached to the manikin's head with a football helmet over the accelerometers. A plastic box on the manikin's right shoulder contains a pair of digital acquisition cards onto which data from the accelerometer chips is recorded.

Table 1. Summary of Sampled Football Field Characteristics

Synthetic Turf Field	Month Tested	Football Offseason	Temperature (˚C)	Year of installation
1	July	Yes	27.8	2017
2	August	No	29.4	2016
3	October	No	29.4	2012
4	October	No	28.3	2019
5	October	No	28.3	2016
6	November	No	27.8	2016
7	November	No	26.7	2013
8	December	No	26.7	Unknown
9	December	No	26.7	Unknown
Natural Grass Field	**Month Tested**	**Football Offseason**	**Temperature (˚C)**	**Length of Grass (cm)**
1	May	Yes	26.7	2.5
2	May	Yes	26.1	1.0
3	June	Yes	30.0	2.5
4	August	No	30.0	6.4
5	August	No	30.6	2.5
6	August	No	29.4	1.0
7	August	No	28.3	1.5
8	September	No	29.4	1.0
9	September	No	28.9	1.0
10	September	No	28.3	1.5

corresponding P-values were calculated using an unpaired t-test. Comparison of field position and correlation with other field characteristics were performed by ANOVA analysis and Pearson's correlate, respectively, using IBM SPSS Statistics, Version 29 (IBM, Inc., Armonk, NY).

Results

Data was collected on 10 natural grass and 9 synthetic fields which culminated in a total of 1710 total drops. Average daily temperature of testing was 27.9 °C and 28.8 °C for synthetic turf and natural grass respectively. Most tests occurred during the football season; 1 out of 9 synthetic turf fields and 3 out of 10 natural grass fields were tested in the football offseason.

ANOVA analysis between field position groups demonstrated no significant differences for each sensor and fall type at the 40-yard line, 20-yard line, and endzone with exception of the ear sensor during side falls only (**Supplemental Table 1**). Field position largely had no influence on the deceleration force, therefore, data was aggregated by accelerometer and drop type only. Results are summarized in **Figure 2** with means measured in g's and 95% CI shown as error bars. Forward drops between grass vs. synthetic fields showed higher decelerations on synthetic fields in all sensors; forehead, apex, and side (mean [95% CI] measured in g's 117 [114.2-119.8] vs. 129 [126.5-131.5] P=.001, 56 [55.4-55.6] vs 61 [60.5-62.5] P=.001, 78 [76.4-80.3] vs 82.7 [80.7-84.8] P=.002). Backwards drops also demonstrated this pattern in forehead, apex, and side sensors (139 [136.7-140.5] vs 148 [146.1-150.2] P=<.001, 135 [131.9.5-137.9] vs 144 [141.5-147.0] P=<.001, 130 [126.9-133.1] vs 139 [137.1-141.3] P=<.001). Falling on the side demonstrated significant differences in the apex sensor only (133 [130.4-135.9] vs 157 [153.7-159.4] P=<.001) **(Table 2)**.

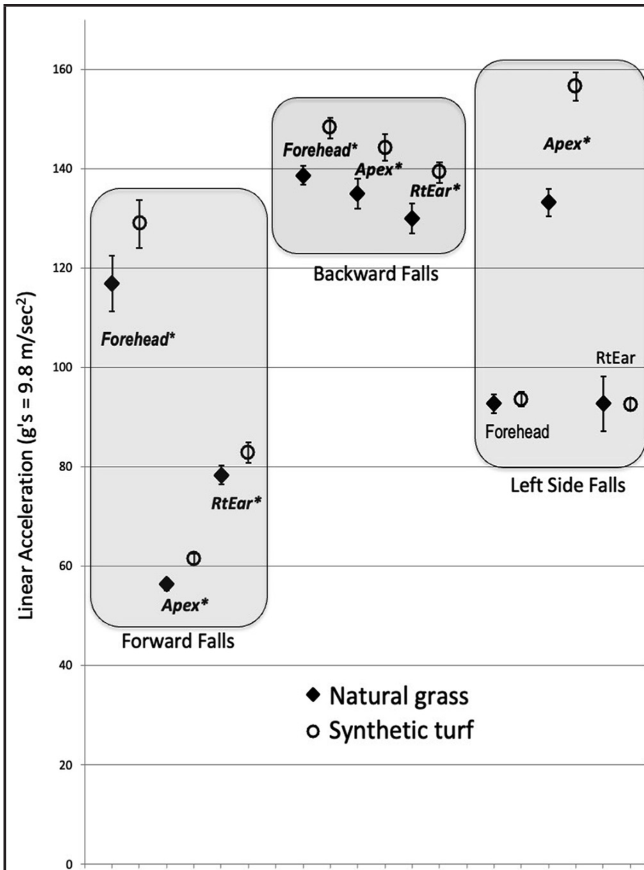

Figure 2. Comparison of Impact Deceleration on Natural Grass and Synthetic Turf

Natural grass (solid diamond) and synthetic turf (open circle) fields aggregated by fall types (Forward, Backward, Left Side) and sensor locations (Forehead, Apex, RtEar) displayed in mean in g's and 95% CI. An asterisk (*) indicates statistically significant differences (P<.05).

Supplemental Table 1. ANOVA Comparison of Impacts Among 40-Yard, 20-Yard, and Endzone Field Positions

	Sensor	Sum of Squares[a]	Mean Square	F-value	Significance
Front Drops	Forehead	9733.2	4866.6	2.5	P =.083
	Apex	217.6	108.8	1.1	P =.34
	Right Ear	1669.2	834.6	2.9	P =.057
Backwards Drops	Forehead	154.9	77.5	0.1	P =.90
	Apex	1545	772.5	1	P =.35
	Right Ear	130.7	65.3	0.1	P =.92
Side Drops	Forehead	425.6	212.8	0.2	P =.82
	Apex	502.4	251.2	0.4	P =.65
	Right Ear	22632.2	11316.1	6.3	P =.002

[a] Sum of squares measured in g's (9.8m/s²)

Table 2. Student's T-test Comparison of All Falls for Each Sensor and Drop Type Across All Grass and Synthetic Turf Fields				
	Sensor	Natural Grass Mean in g's [95%CI][a]	Synthetic Turf Mean in g's [95%CI][a]	Significance
Forward Drops	Forehead	117.9 [114.2-119.8]	128.8 [126.5-131.5]	P =.001
	Apex	56.4 [55.4-55.6]	61.5 [60.5-62.5]	P <.001
	Right Ear	78.3 [76.4-80.2]	82.8 [80.7-84.8]	P =.002
Backwards Drops	Forehead	138.6 [136.7-140.5]	148.2 [146.1-150.2]	P <.001
	Apex	134.9 [131.9-137.9]	144.3 [141.5-146.9]	P <.001
	Right Ear	130.0 [126.9-133.1]	139.2 [137.1-141.3]	P <.001
Side Drops	Forehead	92.7 [90.8-94.6]	93.6 [92.1-95.1]	P =.46
	Apex	133.2 [130.4-136.0]	156.5 [153.7-159.4]	P <.001
	Right Ear	92.7 [87.1-98.2]	92.5 [91.3-93.7]	P =.95

[a] Means and standard error measured in g's (9.8m/s^2)

Supplemental Table 2. Pearson's Correlation for Additional Field Characteristics							
		Temperature (Celsius)[a]		Turf age (years)[b]		Grass length (cm)[c]	
	Sensor	Correlate[d]	*P*-value	Correlate[d]	*P*-value	Correlate[d]	*P*-value
Front Drops	Forehead	-.229 (545)	<.001	0.075 (208)	.276	-.230 (275)	<.001
	Apex	-.193 (557)	<.001	.166 (208)	.016	-0.032 (287)	.591
	Right Ear	-.193 (551)	<.001	.145 (208)	.036	-.213 (281)	<.001
Side Drops	Forehead	-.250 (557)	<.001	-0.059 (208)	.395	-.135 (287)	.021
	Apex	-.154 (558)	<.001	0.023 (208)	.736	-0.043 (288)	.467
	Right Ear	-.091 (549)	.032	-0.108 (208)	.117	0.069 (279)	.246
Backwards Drops	Forehead	.413 (557)	<.001	.187 (208)	.007	-0.064 (287)	.275
	Apex	-0.067 (554)	.113	0.032 (208)	.641	-.124 (284)	.036
	Right Ear	.333 (568)	<.001	-0.063 (208)	.366	-0.069 (298)	.233

[a] Temperature correlation was performed for all fields due to information availability.
[b] Turf age correlation was performed on 7 of the 9 synthetic fields due to information availability.
[c] Grass length correlation was only performed on natural grass fields.
[d] Correlates are reported as r(degrees of freedom), *P*-values are 2-tail significance.

Additional analyses on field characteristics were performed using Pearson's correlation (**Supplemental Table 2**). Grass length was found to be weakly inversely correlated with acceleration although this finding was not observed across all sensors. The age of the synthetic turf was observed to have minimal to no association on decelerating force. Temperature demonstrated weak inverse correlation with acceleration force that was observed across nearly all drop type and sensors. Sample size was not sufficient for meaningful analysis of impact forces with month of testing or football offseason testing.

Discussion

The results of this study demonstrate that natural grass fields are a softer playing surface compared to synthetic turf fields. Prior literature has quantified the differential surface hardness between various field types, as well as the correlation between field surface type and injury risk. To the authors' knowledge, there has been limited reporting on playing surface hardness at the high-school level that may exhibit a higher degree of variability in field conditions. Additionally, studies examining playing surface hardness have typically used devices such as a Clegg hammer, which measures impact attenuation in a single dimension in a highly uniform manner. The use of a manikin with 3 triaxial accelerometers and the simulation of multiple impact types may better capture the variance between impacts and between different anatomical locations within a single impact. The consistency of higher impact forces on synthetic turf across the majority of accelerometers and drop types strengthens the validity of this finding. One prior study compared natural grass fields to different types of synthetic turf installations, including stitched, hybrid, and woven turf systems, measuring different field areas similarly to the current study. In that article, it was determined that natural grass provided greater impact attenuation than any synthetic turf, consistent with the results of this study.[21] It has been suggested that harder synthetic turf correlates with a higher rate of injuries, particularly lower extremity injuries, though data on concussions is inconclusive.[6,7,11,13] A study representing 17 549 high school and collegiate football players reported a higher rate of severe concussions occurring on synthetic turf rather than natural grass.[22] In contrast, several publications have shown fewer concussions on artificial turf or higher post-concussive symptom severity due to contact with natural grass.[13,23] This variability in head injury risk and outcomes can likely be attributed to the multifactorial nature of head injuries, such as force magnitude and direction, helmet characteristics, and level of competition.[18] While the present study does not provide a definitive answer to the question of whether concussions are more likely on natural grass versus synthetic turf fields, it aims to add to the literature providing a biomechanical rationale for differential rates of concussions caused by head-to-surface impact.

The results of this study provide a baseline biomechanical comparison between impact forces on natural grass versus synthetic turf football fields. In high school American football players, concussions occur when head impacts approach 95 g.[24] A study of 124 youth American football players aged 9-14 determined that 62.4 ± 29.7 g was the threshold for concussions.[25] Because most of the fields tested in this study are used for both youth and high school football, it was important to capture this wide range of forces. The impacts generated in this study encompass and exceed this range of forces in various accelerometers and drop types, with the lowest impacts observed on natural grass in the apex accelerometer in front drops (56.4 g) and highest impacts observed on synthetic turf in the apex accelerometer in side drops (156.5 g). As previously stated, the lower threshold for concussions in younger players is most likely a function of physiological development. Youths' heads grow to over 90% of their full size by the age of 5 and reach adult size between the ages of 10 and 16.[26] In contrast, body development lags behind, resulting in an increased head-to-body ratio for youths relative to adults. In addition, children have reduced neck strength and musculature, limiting their ability to brace against rapid head acceleration and deceleration.[27] Young athletes may be more susceptible to even small differences in force, further amplifying the need to minimize surface hardness in small increments.

A multitude of factors can impact field hardness, including field maintenance, weather, and compaction due to use.[19] There is a misconception that one of the benefits of synthetic turf over natural grass is that synthetic turf is maintenance free. Routine maintenance practices such as raising matted-down fibers, infill restoration, and paint and debris removal, may be required even weekly depending on field usage. Twomey et al reported a higher risk of injury on field surfaces that had unacceptably low hardness as well as unacceptably high hardness, emphasizing the importance of field maintenance for natural grass fields.[16] The composition, turf thickness, and material underlying the synthetic turf layer can also have significant effects on its hardness.[20] The infill used to mimic soil in synthetic turf installations, often referred to as crumb rubber, alter the impact of falling onto the turf. One study identified decreased infill density as a risk factor for football injuries.[28] A greater density of infill logically softens the impact, but these beads can degrade or be depleted over time, making maintenance crucial. Natural grass fields have traditionally required more frequent maintenance, as grass length and soil compaction change quickly over time and can alter impact force. The type of grass can also affect the field hardness. Some natural grass fields are installed using "sod," which is grass grown elsewhere, removed from the site of growth, transported to the field site, and rolled out onto the new playing surface. Other fields are grown naturally from seed. The significance of these different growing types is that playing surface hardness may be influenced by the method in which a field is grown. The aeration from the upheaval of the sod may influence how compact the surface is. Although this effect has not been well studied it does pose a potential confounder in analyzing natural grass fields. One strength of the present study is the number of fields that were tested to account for these variables that can affect playing surfaces.

The increased awareness of brain injury detection and long-term effects of brain injuries on children and adolescents must be met with a proportionate investment into examining all aspects of injury prevention. The results of the current study provide a basis for one aspect of sports safety policy in terms of equipment and environment modification. National and state-level sports organizations and governing bodies should establish data collection protocols to better understand the context in which injuries happen, such as field characteristics, equipment usage, or level of play. Analyses of these results may contribute to a more complete understanding of the circumstances that influence injury rates and therefore improve injury prevention efforts. In the state of Hawai‘i, guidelines established by the National Federation of State High School Association (NFHS) and Act 197 in Hawai‘i state legislature form the basis of concussion management.[29] These guidelines place an emphasis on symptomatology and diagnosis by enforcing initial symptom assessment, evaluation by a healthcare provider, gradual return to activity, and reporting of diagnoses to the ImPACT database. The utility of such guidelines and the reporting database could be strengthened for the purposes of further research by encouraging the reporting of variables such as field characteristics and conditions. Although this study was not designed to demonstrate a causative relationship between surface hardness and concussion rates, the results do demonstrate a significant difference in surface hardness between natural grass and synthetic turf fields. Therefore, further research and data collection is needed to incorporate these findings into sports safety policy.

One limitation of the current study was the simulated representation of an adolescent football player and impact against the ground. Although the manikin is representative of a human adolescent in size, neither weight nor composition were modified to complete accuracy. Future testing may feature more accurate representations of human anatomy or utilize sensors on live players. Additionally, some field testing was conducted during the football offseason, when fields may not have been adequately maintained to playing standards. Another limitation was that testing on a particular field was conducted over a single day. As previously stated, maintenance and weather conditions may have a significant effect on field hardness. Despite the findings of the current study, it is possible for a new, well-built, and well-maintained synthetic turf field to provide more impact attenuation than a poorly maintained natural grass field. Finally, detailed records of field maintenance, synthetic turf brand, or natural grass type were not able to be obtained. Future studies may include a longer testing period to determine the effect of climate and play usage on field hardness.

Conclusion

This study demonstrates a greater impact deceleration of a helmeted manikin on synthetic turf than on natural grass football fields. More data is needed to determine how a difference in impact deceleration translates to increased risk for concussions or other injuries. This study identifies a potential area of safety improvement for field sports of all levels, which can inform decision-making by sports organizations and governing bodies.

Conflict of Interest

None of the authors identify any conflicts of interest.

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Just World Beliefs among Medical Students and the General Public in Hawai‘i

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Abstract

Just World Beliefs (JWBs) are a psychological tendency to conclude the world is an inherently fair place in which people experience the outcomes they deserve. Strong JWBs positively correlate with a personal commitment to long-term ambitions and blaming people for their negative health outcomes. This study aimed to measure JWBs in medical students and the general population of Hawai‘i. It was hypothesized that (1) medical students would have stronger JWBs than the general public, and (2) JWBs would be strongest for medical students in the latter part of their training. Current residents of Hawai‘i and medical students at the University of Hawai‘i at Mānoa were recruited to complete a web-based survey measuring JWBs using the Global Belief in a Just World Scale. A t-test was used to compare JWB strength between the groups. A regression analysis identified factors predicting strength of JWBs. Contrary to both hypotheses, medical students in Hawai‘i possessed weaker JWBs than Hawai‘i residents (P<.01), and JWBs did not differ based on training duration (P=.97). Age (P<.01) was the only demographic variable to significantly predict JWBs. The difference in JWBs among medical and non-medical cohorts was no longer significant after controlling for age. Among medical students, younger age was associated with weaker JWBs. Future studies should explore the prevalence and effects of JWBs among diverse populations and the medical professionals that care for them.

Keywords

Medical education, Health psychology, Social psychology

Abbreviations

GBJWS = Global Belief in a Just World Scale
GED= General Education Development
JABSOM = John A Burns School of Medicine
JWB = Just World Belief
mTurk = Mechanical Turk
NIMHD = National Institute on Minority Health and Health Disparities
NIH = National Institutes of Health
UH-Mānoa = University of Hawai‘i at Mānoa

Introduction

Aspiring medical professionals enter their clinical training with varied experiences, biases, and belief systems that shape how they learn and practice medicine. Just World Beliefs (JWBs) are defined as a tendency to view the world as an inherently fair place in which people experience the outcomes they deserve.[1-2] JWBs suggest people have control over their fate and negative outcomes are the direct result of a person’s decisions.

Strong JWBs are linked to an increased commitment to long-term ambitions and an aversion to using unjust methods to achieve goals.[3-4] Because a commitment to the study of medicine and avoiding unethical behavior are considered valuable competencies for medical school applicants,[5-6] it is possible that medical schools may be more likely to accept applicants with strong JWBs. Additionally, JWBs serve as a protective coping mechanism that decreases stress, increases life satisfaction, and empowers the believer to feel control over personal outcomes.[7-9] However, the degree to which an individual holds JWBs also positively correlates with victim derogation, including disease stigma,[10-11] blaming victims of sexual assault,[2,12] and decreased support for expanding medical treatment access to vulnerable populations.[13]

This study examined the hypothesis that medical training may strengthen existing JWBs among medical students by encouraging trainees to link poor health outcomes to risk factors and life choices in patients, allowing students to feel they have some control over their own personal health while learning about severe disease pathology. However, the strength of JWBs among medical trainees and personnel has not been well studied.

The primary aim of this study was to quantify the strength of JWBs among medical students in Hawai‘i and compare this measure to the strength of JWBs among the general population in Hawai‘i. It was hypothesized that medical students would have stronger JWBs than the general public even after controlling for demographic characteristics. The secondary aim was to assess whether existing JWBs are strengthened during medical training. To test the hypothesis that medical education reinforces JWBs, this study compared the strength of JWBs among medical students in the first-half of medical training to the strength of JWBs among medical students in the second-half of medical training.

Methods

The University of Hawai‘i at Mānoa (UH-Mānoa) Committee on Human Studies (CHS#2020-00115) approved this study as exempt from full review. Ola HAWAII grant number U54MD007601-34 from the National Institute on Minority Health and Health Disparities (NIMHD), a component of the National Institutes of Health (NIH), funded this study. The funding agency had no influence on the final data interpretation and resulting manuscript. The contents are solely the responsibility of the authors and do not represent the official view of NIMHD or NIH.

Participants

Medical Student Cohort

Medical students enrolled in UH-Mānoa's John A. Burns School of Medicine (JABSOM) were recruited for this study. JABSOM is the only medical school in the state, and approximately 90% of incoming JABSOM students are Hawai'i residents.[14] In April 2021, an invitation to participate in this study was emailed to 305 current medical students through an existing e-mail distribution list. Respondents completing the survey received a $20 electronic Starbucks gift card by email. The web-based survey remained open until May 2021.

Hawai'i State Resident Cohort

To serve as a comparison group, a sample of Hawai'i residents was recruited using Amazon Mechanical Turk (mTurk) (Amazon Web Services, Seattle, WA) from December 2020 until April 2021. This online crowdsourcing marketplace of 500 000 registered users provides an avenue for recruiting individuals meeting specific demographic criteria for research participation without compromising data quality.[15-18] Registered mTurk users were eligible for participation if they identified as residents of Hawai'i over 18 years of age on their mTurk profile. Respondents received $5 paid through the mTurk web site for their participation, an amount consistent with the compensation provided to mTurk users for tasks of similar duration.[19]

Questionnaire

All participants completed an online consent form and an anonymous web-based survey with 54 questions via REDCap version 12.4.11 (Vanderbilt University, Nashville, TN) hosted by UH-Mānoa.[20-21] Data utilized in this study consisted of demographic questions (11 items) followed by an assessment of JWBs (7 items). Two scales related to reproductive health stigma (33 items) were included in this survey for a study outside the scope of the current manuscript. The surveys for both cohorts (medical students and Hawai'i residents) were identical with the exception of demographic questions concerning level of education. For example, Hawai'i residents were asked about the highest level of education attained with options starting at General Education Development (GED) or less than a high school diploma. The Hawai'i resident survey also asked whether a respondent's doctorate degree is in a clinical field or a non-clinical field. The medical student participants were asked for current level of training with options including pre-clinical medical student (first 2 years of medical school) and clinical medical student (last 2 years of medical school). Because 1 in 4 people in Hawai'i identify with 2 or more races,[22] each participant was able to select multiple race and ethnic identities.

JWBs were measured using the 7-item Global Belief in a Just World Scale (GBJWS).[23] This validated assessment asks participants to report their level of agreement with a series of short statements (such as "I feel that people get what they deserve" and "I feel that people who meet with misfortune have brought it on themselves.") using a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The GBJWS responses are summed to produce a total mean score ranging from 7 to 42 and a per-item mean score ranging from 1 to 6. Higher scores on this scale signify stronger JWBs. This scale was chosen for its brevity, high internal consistency, and widespread use in previous studies.[10,23-24] To improve the quality of the data in the final analysis, 3 attention filter checks were utilized in both the demographic and scale portions of the survey, a practice that has been successfully used in other web-based research surveys in an effort to exclude bots and participants who are completing the survey without reading the question prompts.[17,25] For example: "Everyone has a favorite food. You may enjoy burgers, tacos, or salads for dinner, but select pizza from the items below." Participants who did not choose "pizza" as the answer to this question were excluded from the analysis.

Data Analysis

Using IBM SPSS version 28 (IBM Corp, Armonk, NY), the demographic characteristics of each group were analyzed using descriptive statistics. JWBs between the 2 cohorts were compared using a *t*-test. Linear regression modeling with JWB strength as the dependent variable was utilized to identify factors associated with stronger JWBs. As a final step, a series of linear regression models were developed with JWB strength as the dependent variable. Independent variables included age, gender, race and ethnicity, and cohort (medical student vs Hawai'i residents). Preliminary models were investigated with separate dummy variables for each Asian ethnicity and with all 6 subgroups combined into a single Asian and Pacific Islander variable. Independent variables for race and ethnic identities with less than 10 participants were not included in the regression analysis.

Results

Response Rate

A total of 162 medical students participated in the survey. Results from 33 medical student participants were excluded due to incorrectly answering the attention filter questions (28 respondents) or completing less than 5% of the survey questions (5 respondents). The final analysis included 129 medical student participants, yielding a 42% response rate.

One hundred sixty-seven surveys were submitted from the Hawai'i resident mTurk cohort of which 117 survey responses were from unique participants. Some mTurk users submitted the survey multiple times. When duplicate submissions from the same person were identified, only the first survey was included in the analysis. Twenty-six participants were excluded for incorrectly answering attention filter questions (23 respondents) or for completing less than 5% of the survey questions (3 respondents). The final analysis included 91 residents of the state of Hawai‘i.

Participant Demographics

Mean ages for the medical student cohort and the Hawai‘i resident cohort were 25.9 years and 35.8 years, respectively (see **Table 1**). Forty percent of all participants (88 out of 220) identified with multiple racial and ethnic groups with 25.5% reporting 2 races/ethnicities and 14.5% reporting 3 or more races/ethnicities. The majority of participants in both the Hawai‘i resident and medical student cohorts identified as Asian (56.0% and 82.9% respectively). The Hawai‘i resident cohort included fewer Chinese respondents (9.9% vs 36.4%), fewer Vietnamese respondents (0% vs 7.8%), and more Black or African American participants (6.6% vs 0%) than the medical student cohort. Almost half of the Hawai‘i resident cohort (47.2%) and 29.6% of the medical student cohort reported 2 or more races or ethnic identities. Half of the Hawai‘i resident cohort (49.5%) and 31.0% of the medical student cohort identified as male.

Table 1. Demographic Characteristics of Medical Student and Hawai‘i Resident Cohorts

	Medical Student Cohort (n=129)	Hawai‘i Resident Cohort (n=91)
Mean Age (years)	25.9	35.8
	No. (%)	**No. (%)**
Race and Ethnic Identities[a]		
White/Caucasian	48 (37.2%)	45 (49.5%)
Black/African American	0 (0%)	6 (6.6%)
Asian	107 (82.9%)	51 (56.0%)
Japanese	54 (41.9%)	28 (30.8%)
Filipino	25 (19.4%)	16 (17.6%)
Chinese	47 (36.4%)	9 (9.9%)
Korean	12 (9.3%)	8 (8.8%)
Vietnamese	10 (7.8%)	0 (0%)
Native Hawaiian	13 (10.1%)	9 (9.9%)
Hispanic	5 (3.8%)	1 (.8%)
Other	8 (6.2%)	8 (8.8%)
≥ 2 race or ethnic identities	61 (47.2%)	27 (29.6%)
Gender		
Female	89 (69.0%)	46 (50.5%)
Male	40 (31.0%)	45 (49.5%)
Education		
No college education	0 (0%)	12 (13.2%)
Some college or advanced degree	127 (100%)	79 (86.8%)

[a] Participants had the option of selecting multiple races and ethnicities.

The Hawai‘i resident cohort included participants with a wide-range of education levels with the majority having completed at least some college and 1 participant earning a non-medical doctorate degree. Among the medical student cohort, 54.3% were in the pre-clinical portion of their training (first 2 years of medical school) and 45.7% were in the clinical portion of their training (years 3 or 4 of medical school).

JWBs Among Medical Students and Hawai‘i Residents

Total scores on the GBJWS ranged from 7 to 40 with an overall mean of 21.1 and a standard deviation of 5.7 (see **Figure 1**). The per-item GBJWS mean was 3.0 with a standard deviation of .81. Overall JWBs proved to be weaker in the medical student cohort (mean: 20.0; SD: 4.7) compared to the Hawai‘i resident cohort (mean: 22.6; SD: 6.4; P<.01). Within the medical school cohort, there was no significant difference in JWB strength between first- and second-year students near the start of their training (mean: 20.0; SD: 4.9) versus third- and fourth-year medical training near the end of their training (mean: 20.1; SD: 4.4).

Regression Analysis

Overall, the final regression model accounted for 11.3% of the variance in GBJWS score (F[5,170]=4.3; P<.01). Black race and Hispanic ethnicity were excluded from the regression analysis due to having less than 10 participants with these identities. Race, ethnicity, and gender did not predict JWB strength in the final regression model. Participant age was significantly related to JWB with a standardized β of .24 (see **Table 2**). Therefore, this model predicts that with every 1 standard deviation increase in age (8.9 years), GBJWS score will increase by .24 of a standard deviation (equivalent to a 1.3 scale points). Cohort membership (medical student vs Hawai‘i resident) was not a significant factor after accounting for the influence of age and race/ethnicity.

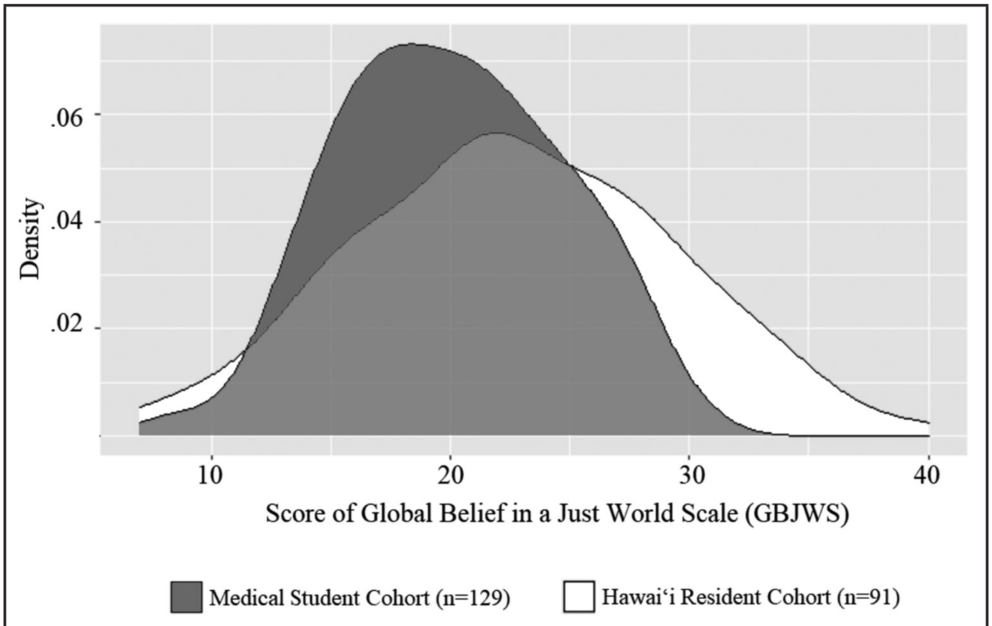

Figure 1. Density Plot of the Distribution of Global Belief in a Just World Scale Scores among Medical Students and Residents of Hawai‘i

The Y-axis is the proportion of each cohort with each score. The X-axis is the Global Belief in a Just World Scale score.

Table 2. Linear Regression Analysis for Predicting Strength of Just World Belief Scale Scores

	β (95% CI)	Standardized β	t	*P*-value
Significant Factors				
Age	.16 (.04 to .27)	0.24	2.7	<.01
Non-Significant Factors				
White race	-.64 (-2.58 to 1.30)	-.05	-0.65	.52
Asian & Pacific Islander	1.27 (-1.03 to 3.56)	0.09	1.09	.28
Male Gender	-1.04 (-2.85 to .77)	-.09	-1.14	.26
Medical Student Cohort	-1.40 (-3.52 to .73)	-.12	-1.3	.2

Discussion

Contrary to the hypothesis, the medical student cohort held weaker JWBs than Hawai‘i resident cohort not attending medical school. The mean level of JWBs was the same between medical students in the first-half of medical school training and their peers in the second-half of medical school training, a finding contrary to this study's second hypothesis that medical students' JWBs would be strongest for students with a longer duration of exposure to medical education. This finding suggests JWBs may be unaffected by exposure to medical school training. Further, the regression analysis revealed that the decreased strength of JWBs among medical students was primarily explained by the young age of this cohort. All medical students in this study were 32 years or younger, and younger age was associated with weaker JWBs. Other studies have identified a similar relationship between age and JWBs, but the reasons JWBs are higher among older people remain unclear.[26-27]

This study recruited people living or attending medical school in Hawai‘i, a population that is demographically distinct from the population of the continental US.[22] Compared to overall US population, Hawai‘i's population includes a higher proportion of people who are Asian, Native Hawaiian, Pacific Islander, or multiple races. Although previous studies have identified cultural, regional, and racial differences in JWBs,[28-31] JWBs among Hawai‘i residents in this study were similar to previously published measures of JWBs among North American adults.[32-33] When this scale was initially developed using a sample of undergraduate students in North Carolina, the mean GBJWS total was 23.8,[23] and more recent studies utilizing national samples found similar mean GBJWS totals between 22.6 and 23.6.[32-33] Cultural differences likely interact with JWBs in complex ways, and the presence of JWBs among the many cultures of Hawai‘i could be explored in future research.

This study is a novel investigation of JWBs among a previously unexplored population, medical student trainees. A 2023 study explored the role of just world belief among nursing trainees in the southeast US, concluding that JWBs mediated the relationship between past personal trauma and attitudes towards trauma-informed care among nursing students. Nursing students with high JWBs were less likely to have experienced past adverse childhood experiences and less likely to embrace trauma-informed care.[34] However, that study did not include medical students and little is known concerning JWBs among practicing health care professionals. JWB strength among the sample of nursing students was similar to the strength of JWBs using the GBJWS among medical students in the current study (Means: 21.3 vs 21.1).

PubMed, Google Scholar, and the University of Hawai'i at Mānoa (UH-Mānoa) electronic library were queried for keywords "Hawaii" [AND] "Just World"), and the brief literature review found this study is the third published assessment of JWBs in Hawai'i. The two prior publications of JWBs in Hawai'i studied UH-Mānoa undergraduate students.[10,30] In Dalbert and Yamauchi's 1994 study of Hawai'i and German undergraduate students enrolled in introductory psychology courses, Hawai'i students held stronger JWBs than German students and both cohorts demonstrated a positive correlation between strength of JWBs and judgements of the fairness of situations faced by immigrants.[30] More recently, Ebneter and colleagues conducted a study of UH-Mānoa undergraduates enrolled in a psychology course, concluding JWBs were associated with stigmatizing views of eating disorders and obesity.[10] The inclusion of non-undergraduate participants in Hawai'i is a major strength of the current study.

Limitations

Limitations of this study include the sample size which could impact this study's ability to detect small differences between cohorts. Additionally, this study depended on self-reported demographic characteristics, which could produce inaccuracies. Although none of the respondents in the Hawai'i resident cohort identified themselves as a having clinical education when asked about education level, the possibility that a respondent completed surveys for both cohorts cannot entirely be excluded. Additionally, the mTurk cohort of Hawai'i residents may not be representative of the general public. The mTurk participants tend to be more educated and ethnically diverse compared to participants obtained by other sampling methods.[16] These differences may limit the generalizability of this study's findings.

Conclusions

This study demonstrated medical students in Hawai'i have weaker JWBs than the general public of Hawai'i. Based on the results of this study, this difference may be explained by the younger overall age of medical trainees. Further, JWBs were stable across levels of medical school training, contradicting the hypothesis that exposure to illness in medical education would strengthen JWBs. Because JWBs play a role in personal wellness,[7,9] dehumanization,[35] and victim blaming,[2,12] while also mediating the relationship between personal experiences and attitudes towards patient care,[34] understanding JWBs could help develop targeted interventions to minimize these harmful tendencies. For more insight into the influence of JWBs, future studies should explore the prevalence and effects of JWBs among diverse populations and the full range of medical professionals caring for them.

Conflict of Interest

None of the authors identify a conflict of interest.

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Examining Mental Health and Economic Consequences During the COVID-19 Pandemic Among Filipino Residents in Hawai‘i: May – Oct 2020

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Abstract

The coronavirus disease 2019 (COVID-19) pandemic has resulted in rapid and drastic changes to daily lives, posing a threat to residents' mental health and well-being. Filipinos are disproportionately impacted by COVID-19 and have one of the highest COVID-19 prevalence in Hawai‘i. The COVID-19 pandemic has been associated with a rise in mental health concerns, yet little is known about the impact on the mental health of Filipinos in Hawai‘i. Using publicly available polling data from the SMS Community Pulse Survey, this study sought to describe the mental distress experienced by Filipino residents during the COVID-19 pandemic. Data were collected from an online panel of Hawai‘i residents over 4 timepoints (May 5-10; June 11-17; July 31-August 8; October 19-31, 2020). Compared to non-Filipinos, a higher proportion of Filipinos reported feeling stress and sadness during 3 of the 4 timepoints. Across all timepoints, Filipinos were more likely to respond affirmatively to mental health indicators (62.5%). Similarly, Filipinos reported food insecurity in higher proportions relative to non-Filipinos in most timepoints, particularly notable in Timepoint 4 where 33.0% of Filipino respondents reported food insecurity. These findings suggest that Filipinos would benefit from social policy and community-supported initiatives to address social determinants of health, reduce chronic stress, and prevent further mental health disparities.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has resulted in rapid and drastic changes to daily lives. Many Hawai‘i residents temporarily lost their jobs and were socially isolated due to the pandemic lockdowns. Lessons learned from previous public health emergencies show that a tendency towards fear, anxiety, and worry during emergencies is common.[1,2] National and international data demonstrate associations between the COVID-19 pandemic and mental health concerns (eg, depression, stress, and anxiety).[3–5] While one previous study has examined the COVID-19 pandemic and the Filipino community,[6] there is a lack of literature that concentrates specifically on the mental health of Filipinos in Hawai‘i and the socioeconomic consequences of the pandemic.

Filipinos are a significant part of the essential workforce in the US, including health care, food service, and retail industries,[7] which put Filipinos at a higher risk of COVID-19 infection due to increased proximity to potentially infected individuals.[8] Health care workers are especially at risk for COVID-19 infection; Filipino nurses constituted nearly one-third of COVID-19 deaths among US nurses in 2020.[9] Filipinos are overrepresented in the nursing workforce of Hawai‘i and are more likely to work in settings where they will be at an increased risk of potential exposure while caring for a patient infected with COVID-19.[10–12]

Outside of health care, Filipinos make up a large proportion the tourism workforce in leisure, hospitality, and retail occupations in Hawai‘i, which have been heavily impacted during the pandemic.[12] Large proportions of the tourism workers already earn very low wages, and the pandemic and subsequent lockdown further worsened the situation with business closures, which lead to high unemployment rates. Between April to July 2020, Filipinos represented the largest group who filed for unemployment in Hawai‘i.[12] For many, the pandemic has exacerbated ongoing economic struggles that existed prior to COVID-19.

Filipinos bear a disproportionate burden of COVID-19 morbidity and mortality, nationally and in the state of Hawai‘i.[8,13] According to the Hawai‘i State Department of Health,[13] Filipinos account for 16% of the state population but 17% of cumulative COVID-19 cases, and 23% of COVID-19-associated deaths as of August 7, 2023, making Filipinos the most impacted ethnic group after Pacific Islanders. The disproportionate burden of COVID-19 among minority groups is a major concern as it highlights the health inequities, such as chronic disease burden, that persisted prior to the pandemic.[14] Furthermore, the long-term effects of COVID-19 on individuals, families, and communities in the long-term are unknown.

As Filipinos in Hawai‘i have been disproportionately impacted by the COVID-19 pandemic in terms of infections, deaths, and economic consequences, it is likely that their mental health and well-being may also be negatively affected.[3,4,15] Therefore, addressing Filipino mental health during this pandemic is a high priority. Using publicly available data from the SMS Community Pulse Survey, the aim of this study is to describe the economic and mental health conditions experienced among Filipino adults in Hawai‘i during the earlier timepoints of the COVID-19 pandemic (May – October 2020) in comparison to non-Filipino populations.

Conceptual Framework

This study is guided by a conceptual framework proposing that the increased economic uncertainty and employment uncertainty resulting from the COVID-19 pandemic causes psychological stress and different levels of mental health problems.[16] **Table 1** specifies how the consequences of the pandemic relate to stress and mental health. Economic shutdowns and social distancing seek to decrease the spread of COVID-19; however, the unintended consequences of such measures may negatively affect mental health. Economic stability is an important factor in one's mental health and well-being.[17] The massive economic consequences of the pandemic (eg, unemployment) lead to uncertainties and vulnerabilities that may elevate mental distress. Additionally, communities with a lack of adequate testing can lead to uncertainties about COVID-19 spread and susceptibility, and fears of COVID-19 infection can also play a major role in mental health.[18] The impact of economic instability on mental health as a consequence of the pandemic may also be related to socio-demographic factors on a societal and individual level, including age, gender, ethnicity, and social culture.[19]

Methods

SMS Community Pulse Survey

Secondary data was utilized from the SMS Community Pulse Survey, a series of cross-sectional online surveys designed to study the views of Hawai‘i residents toward the COVID-19 pandemic.[19] Respondents were recruited from a panel sample across four timepoints in the year 2020: May 5-10, June 11-17, July 31-August 8, October 19-31. The sample sizes for each SMS Survey timepoint ranged from 401 to 407 (407, 401, 404, and 404 respectively). The panel of respondents was maintained to represent the overall distribution of Hawai‘i residents. To account for variability in respondents by timepoint, respondents were weighted by age, gender, race/ethnicity, income, and residence to the state population based on the 2018 US Census data; weighting was performed by the SMS team using the raking method. The incidence rate (ie, the proportion of respondents from the panel that qualified for the current survey) ranged from 85-90%. Once approximately 400 individuals completed the survey, the timepoint was closed out.

Data are provided in aggregate form on a publicly available online dashboard.[19] The dashboard allows the user to stratify the outcome variables by demographic variables such as age, sex, and gender.

Measures

The primary aim was to compare outcomes between Filipinos and those not categorized as Filipinos. Survey respondents selected their primary ethnicity as the category they most identified with (Chinese, Filipino, Hawaiian/Part-Hawaiian, Japanese, Mixed/Others, White/Caucasian). Non-Hawaiian Pacific Islanders and mixed race/ethnicity respondents are captured in the "Mixed/Other" category. **Table 2** lists the survey questions and selected response option indicators used for analysis. These survey questions and response option indicators were primarily selected due to their overlap with the conceptual framework in describing aspects of or affecting mental distress and economic/employment uncertainty.[16] All other SMS Community Pulse survey questions and response options were not used for analysis.

Analyses

Integrating publicly available information derived from the Hawai‘i Department of Health News Releases[20] and Department of Defense[21] websites, a timeline was generated of both federal and state-level policy responses over the course of our study period; specific policies were selected for their perceived coverage and qualitative relevance to the aims of the study. Using data from March to October 2020 on newly diagnosed COVID-19 cases in Hawai‘i compiled by The COVID Tracking Project,[22] an organization from The Atlantic that collects and publishes state-level data on COVID-19 in the US, the 7-day moving average of new COVID-19 cases (daily cases averaged over a 7-day period) was calculated to generate a case epidemic curve. Similarly, a curve visualizing the weekly requests for unemployment payments, whether or not benefits were actually paid, was overlaid to provide further contextual information on the overall financial situation across all Hawai‘i residents during the early months of the COVID-19 pandemic; these publicly available data were obtained from the Hawai‘i Department of Labor and Industrial Relations.[23] To illustrate differences in indicator endorsement among Filipinos over time, the proportions of the survey indicator responses for Filipinos and non-Filipinos across each survey timepoint were sliced from the SMS Community Pulse online dashboard; these data were descriptively overlaid with the state-level COVID-19 epidemic curve and weekly unemployment payments request to provide contextual insights to the observed changes and differences. All other survey indicators of interest were similarly summarized by weekly average of cases and unemployment claims between the end of each survey timepoint. All analyses were descriptive in nature, utilizing the weighted percentages as presented on the SMS Community Pulse online dashboard, and the data was organized using Microsoft Excel version 2308 (Microsoft Corporation).

Table 1. Conceptual Framework of How COVID-19 Impacts Mental Health (adapted from Lu & Lin, 2021)			
Determinants	**Mechanism**	**Mental Health Outcomes**	**Boundary Conditions**
COVID-19 pandemic **Prevention and intervention measures** (eg, lockdown, quarantine, self-isolation)	**Economic Uncertainty** ● Income uncertainty ● Financial difficulties ● Economic pressure ● Economic worries ● Food security worries **Employment Uncertainty** ● Employment difficulties ● Involuntary underemployment ● Involuntary unemployment ● Job instability or insecurity ● Inability to work	● Mental distress (depression, anxiety, pressure) ● Fear ● Hopelessness/Despair ● Loneliness ● Xenophobia	**Social Context** ● Economic development ● Social culture ● Economic intervention policy ● Duration **Individual Context** ● Demographic characteristic ● Personality

Table 2. SMS Community Pulse Survey Indicators		
Category	**Survey Question**	**Selected Indicator Response Option**
Economic & Employment Uncertainty	What is your employment situation now?	Been permanently let go / temporarily laid off
	Which of the following statements best describe your household's current financial situation?	Running into debt ("Yes")
	To what extent has your own life been affected or disrupted by the coronavirus situation?	A great deal
	Did you experience any of the following feelings in the past few days?	Worried about having enough food for my family ("Yes")
Mental Health	What is your impression of the coronavirus situation today?	Still getting worse
	How worried are you that you or someone in your family will get sick from COVID-19?	Very Worried
	Did you experience any of the following feelings in the past few days?	Happiness ("No") Enjoyment ("No") Sadness ("Yes") Worried in general ("Yes") Stress ("Yes") Fear ("Yes") Worried in general ("Yes)

Results

Figure 1 illustrates the 7-day moving average COVID-19 case count and weekly unemployment claims in Hawai'i, along with the state and federal policies that were implemented during the pandemic, from March 2020-October 2020. There was a 23-fold increase in unemployment claims from March to May 2020 (Timepoint 1), which then plateaued before decreasing in September 2020; by the end of the study period (October 31, 2020), weekly unemployment claims remained nearly 10 times greater than at the beginning of March 2020. A notable surge in COVID-19 cases was observed from July to August 2020 (Timepoint 3), from an average of 18 cases per day for the first week of July to 248 cases per day by the end of August. By the end of September 2020, the average number of COVID-19 cases appeared to drop down to approximately 100 per day, then dropped to an average of 66 cases per day during the final week of Timepoint 4.

Table 3 shows the percentage points for affirmative responses to each mental health indicator by Filipinos and non-Filipino ethnicities. **Table 3** also include arrow icons to visualize the direction and magnitude of the percent difference between Filipino and non-Filipino respondents. One arrow indicates at least a 10% difference between the two groups, and two arrows indicate at least a 20%. The arrow(s) point towards the group with the larger percentage. Notably for most indicators (65% overall across all timepoints) there was a greater percentage of Filipinos who responded affirmatively, with 33% of indicators with at least a 10% difference. This was particularly notable during Timepoint 4 (80% of indicators).

Economic and Employment Uncertainty

A higher proportion of Filipino respondents reported being temporarily or permanently unemployed than non-Filipino respondents at Timepoint 3 (23.9% greater) and Timepoint 4

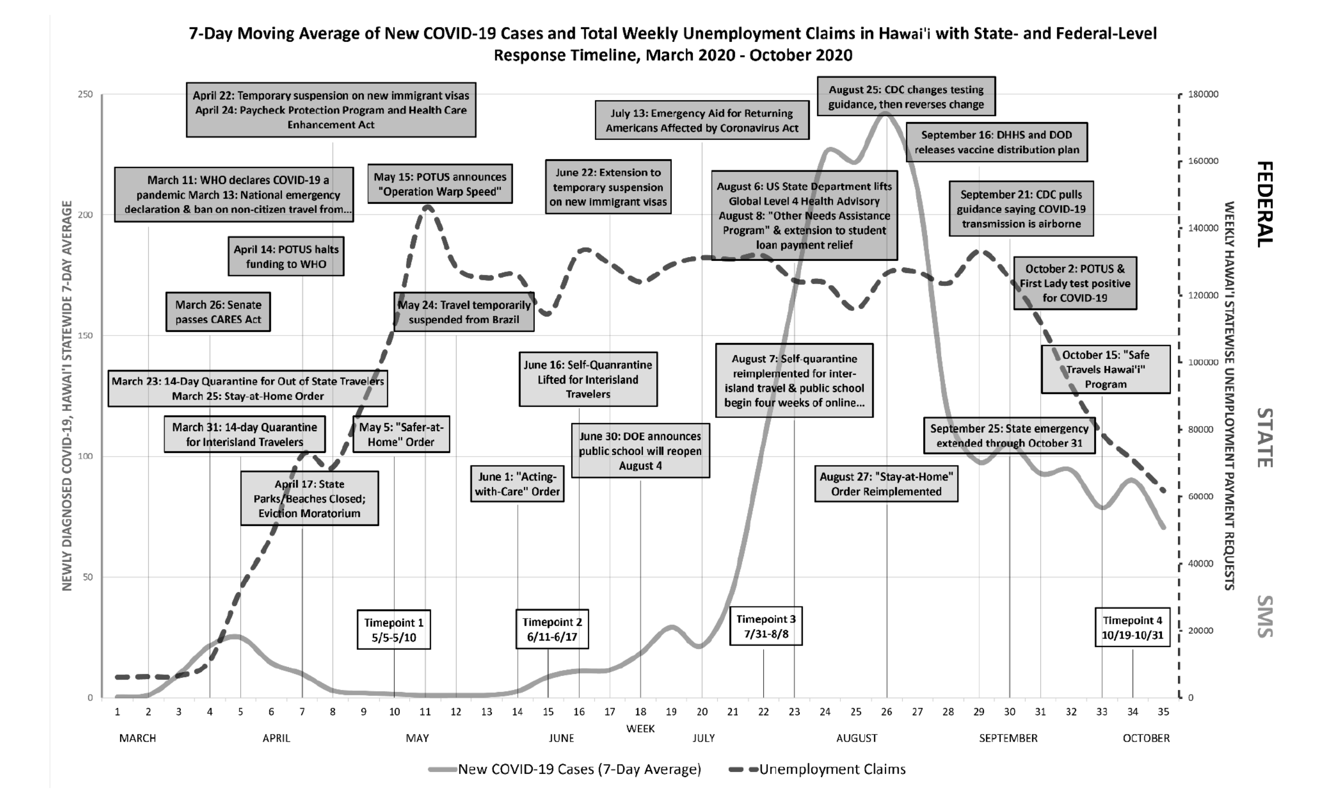

Figure 1. Weekly 7-Day Average of New COVID-19 Cases and Total Weekly Unemployment Claims in Hawai'i with State- and Federal-Level Response Timeline

(10.5% greater). Additionally, more Filipino respondents reported that they were running into debt throughout the observed timepoints, ranging from 9.0% to 17.14% higher compared to non-Filipinos; this was highest at Timepoint 4, where 30.0% of Filipino respondents reported running into debt. Furthermore, at all timepoints except Timepoint 2, a considerably higher proportion of Filipino respondents (>10% higher) reported worry of being able to provide enough food for their family, with an increasing trend during the observation period (**Figure 2**). A third of Filipino reported worry about food insecurity at Timepoint 4 compared to all other respondents (18.7%). When asked whether COVID-19 has affected or disrupted their lives, more Filipino respondents reported that their lives were affected or disrupted "a great deal" (44.2%) by the COVID-19 pandemic relative to all other respondents (24.1%) at Timepoint 1. However, this observation was not consistent across timepoints.

Mental Health

Throughout the observation period, a higher proportion of Filipino respondents reported experiencing stress, ranging from 9.5-24.2% higher than non-Filipinos except at Timepoint 3 (20.9% higher among non-Filipino respondents) (**Figure 3**). By Timepoint 4, nearly three-quarters (74.0%) of Filipino respondents reported experiencing stress, which was considerably higher than other ethnic groups (49.8%). Also, the highest proportion of both Filipino and non-Filipino respondents' having a negative perception of the pandemic situation ("still getting worse") was observed during Timepoint 3 (80.0% and 81.5%, respectively), which coincided with the rising cases of COVID-19 during that time. While fewer Filipino than non-Filipino respondents reported feeling very worried about themselves or their family getting sick from COVID-19 at most timepoints, the proportion appeared to increase throughout the observed time period from 28.6% at Timepoint 1 to 39.6% at Timepoint 4. Similar to non-Filipinos, most Filipino respondents reported feeling worried in general throughout the observation period; this observation was highest during Timepoints 1 and 4 (64.5% and 60.0%, respectively), which coincided with increasing reports of COVID-19 cases at the time (**Figure 1**).The proportion of Filipino respondents reported feeling fear during the pandemic was similar to non-Filipinos and across the four timepoints (approximately 20%). **Figure 4** illustrates how responses from Filipino respondents to the sadness indicator compared to non-Filipino respondents. More than one-half (52.3%) of Filipino respondents reported feeling sad at Timepoint 1, which was considerably higher than other ethnic groups (24.2%). The proportion of Filipino respondents reporting feelings of sadness was lower when the number of COVID-19 cases appeared to plateau but was higher at Timepoint 4, when the state was experiencing a large surge of COVID-19 cases (**Figure 4**). Additionally, most Filipino respondents reported that they had not felt happiness or enjoyment in the past few days at each timepoint, with the largest proportion of Filipino respondents not feeling happiness (64.6%) observed at Timepoint 3 and not feeling enjoyment (75.1%) at Timepoint 4 (**Table 3**).

Table 3. Indicators of Economic/Employment Uncertainty and Mental Distress by Primary Ethnicity with the Direction and Magnitude of the Percent Difference Between Filipinos' and non-Filipinos' Affirmative Responses as Indicated by Arrows

Indicator	Timepoint 1			Timepoint 2			Timepoint 3			Timepoint 4		
	05/05-05/10			06/11 - 06/17			07/31-08/08			10/19-10/31		
	Filipino		Non-Filipino	Filipino		Non-Filipino	Filipino		Non-Filipino	Filipino		Non-Filipino
The coronavirus situation in Hawaii is still getting worse	3.10%		7.90%	27.90%		31.90%	80.00%		81.50%	36.90%		28.10%
Very worried that I or someone in my family will get sick from COVID-19	28.60%		31.20%	20.80%	→	32.50%	36.90%		44.90%	39.60%		35.40%
My own life has been affected or disrupted by the coronavirus situation a great deal	42.20%	←	24.10%	23.10%	→	33.20%	17.20%	→	29.30%	32.80%		24.70%
Experienced feeling worried in general in the past few days	64.50%	←	50.60%	47.00%		45.30%	52.20%		55.60%	60.00%		54.60%
Experienced feeling fear in the past few days	28.90%		19.00%	21.80%		17.80%	15.20%		26.50%	16.00%		21.00%
Experienced feeling stress in the past few days	59.80%		50.30%	62.90%	←	46.40%	33.80%	→	54.70%	74.00%	⇇	49.80%
Did not experience happiness in the past few days	57.70%	→	69.00%	48.50%	→	60.80%	64.60%		56.30%	55.70%		57.80%
Experienced feeling sadness in the past few days	52.30%	⇇	24.20%	38.20%	←	23.50%	18.90%	→	32.70%	44.30%	←	32.20%
Experienced feeling anger in the past few days	45.90%	⇇	19.00%	32.30%	←	21.40%	25.00%		26.30%	27.20%		22.30%
Experienced feeling loneliness in the past few days	42.90%	←	25.70%	24.90%		21.50%	28.00%		21.90%	26.00%		29.00%
Experienced feeling helplessness in the past few days	48.20%	⇇	24.50%	17.20%		21.90%	24.30%		21.80%	34.50%		27.70%
Did not experience enjoyment in the past few days	69.90%		76.00%	65.83%		61.20%	44.60%	→	58.50%	75.10%	←	56.60%
Experienced feeling worried about having enough food for my family in the past few days	28.10%	←	16.90%	11.31%		10.30%	29.80%	←	12.30%	33.00%	←	18.70%
My household's current financial situation is best described as running into debt	24.20%	←	9. 80%	20.35%	←	9.70%	20.40%		11.30%	30.00%	←	12.90%
My current employment status is permanently or temporarily laid off	20.40%		20.20%	26.22%		20.90%	44.60%	⇇	20.70%	27.70%	←	17.20%
Average Weekly New Cases Between Survey Phases (SD)†	**64.2 (66.1)**			**19.4 (19.8)**			**346.6 (399.8)**			**972.5 (469.5)**		
Average Weekly Unemployment Claims Between Survey Phases (SD)†	**45,153 (38,528)**			**128,032 (11,431)**			**129,243 (3,308)**			**107,618 (24,848)**		

Arrows point towards group with a higher percentage
One arrow indicates at least a 10% difference between Filipino and Non-Filipino groups
Two arrows indicate at least a 20% difference between Filipino and Non-Filipino groups
† Weekly average over the following periods: Phase 1: 03/01-05/10, Phase 2: 05/11-06/17, Phase 3: 06/18-08/08, Phase 4: 08/09-10/31

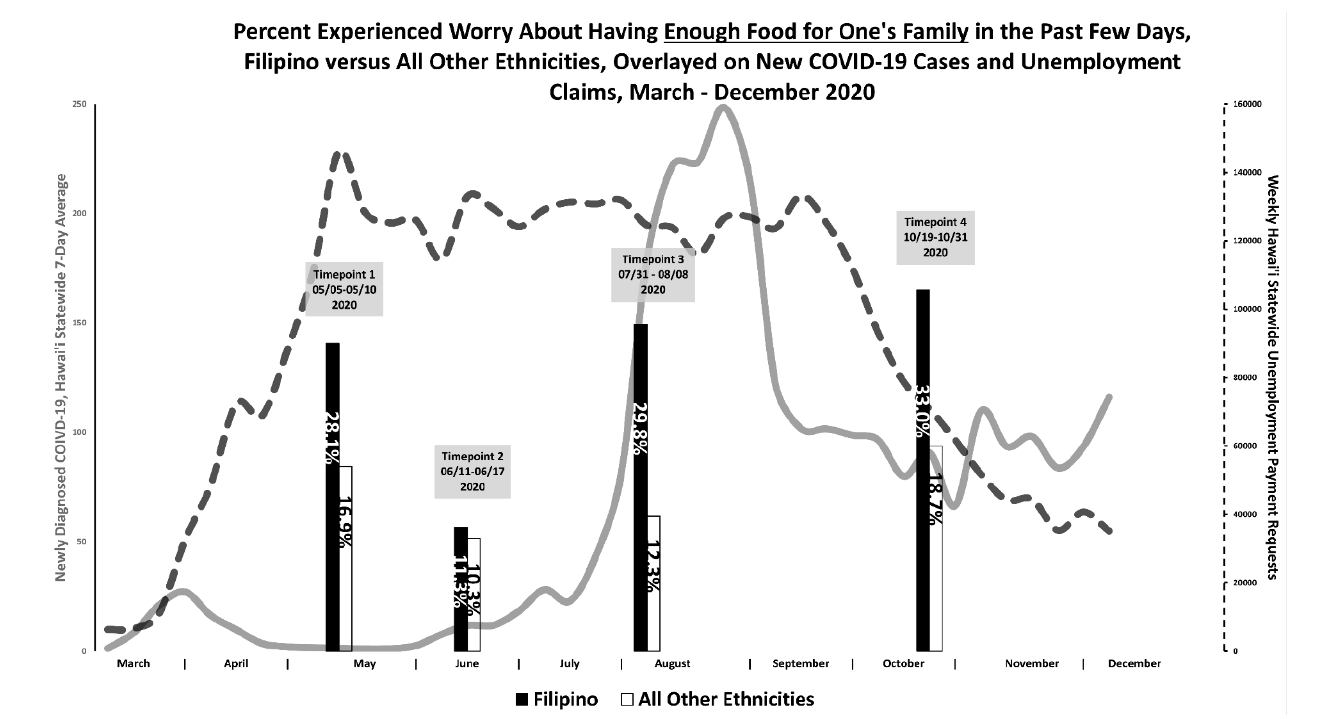

Figure 2. Socioeconomic Hardship and Life Disruption Indicators by New COVID-19 Cases (left y-axis, solid line) and Unemployment Claims (right y-axis, dotted line) in Filipinos and All Other Ethnicities, March – October 2020

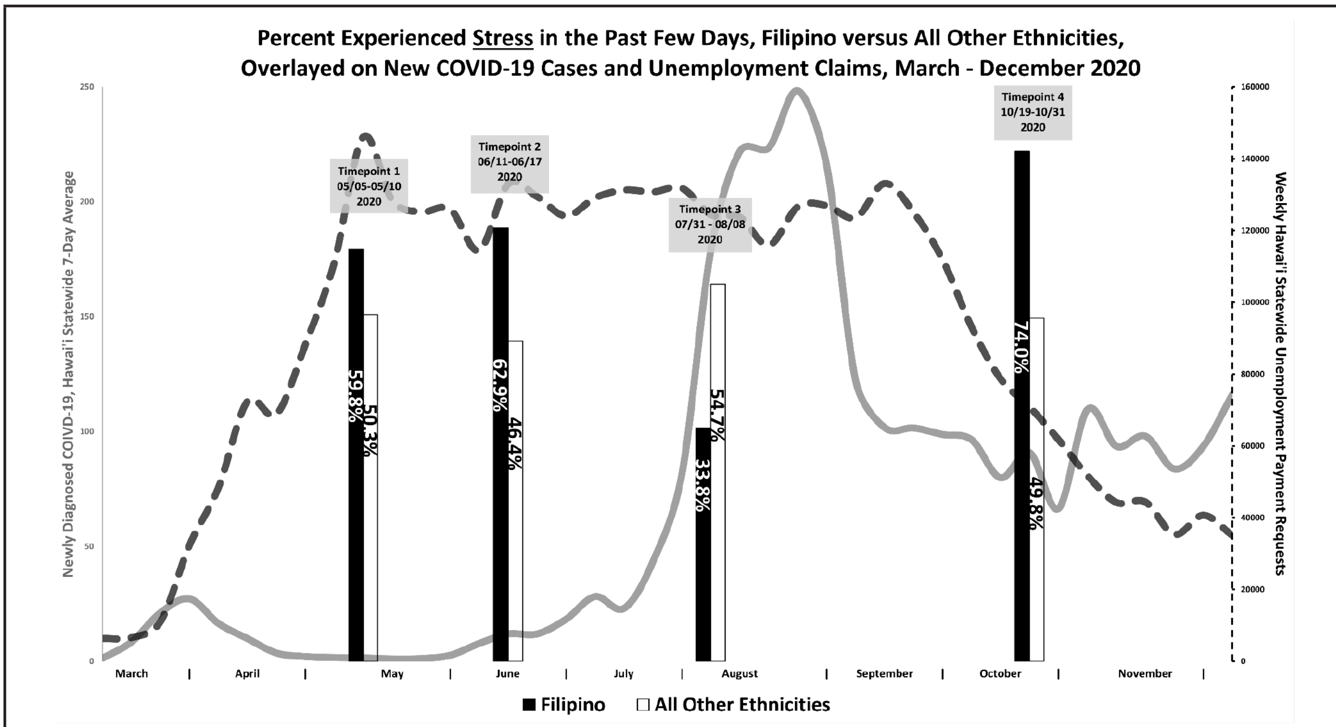

Figure 3. Stress Indicator by New COVID-19 Cases (left y-axis, solid line) and Unemployment Claims (right y-axis, dotted line) in Filipinos and All Other Ethnicities, March – October 2020

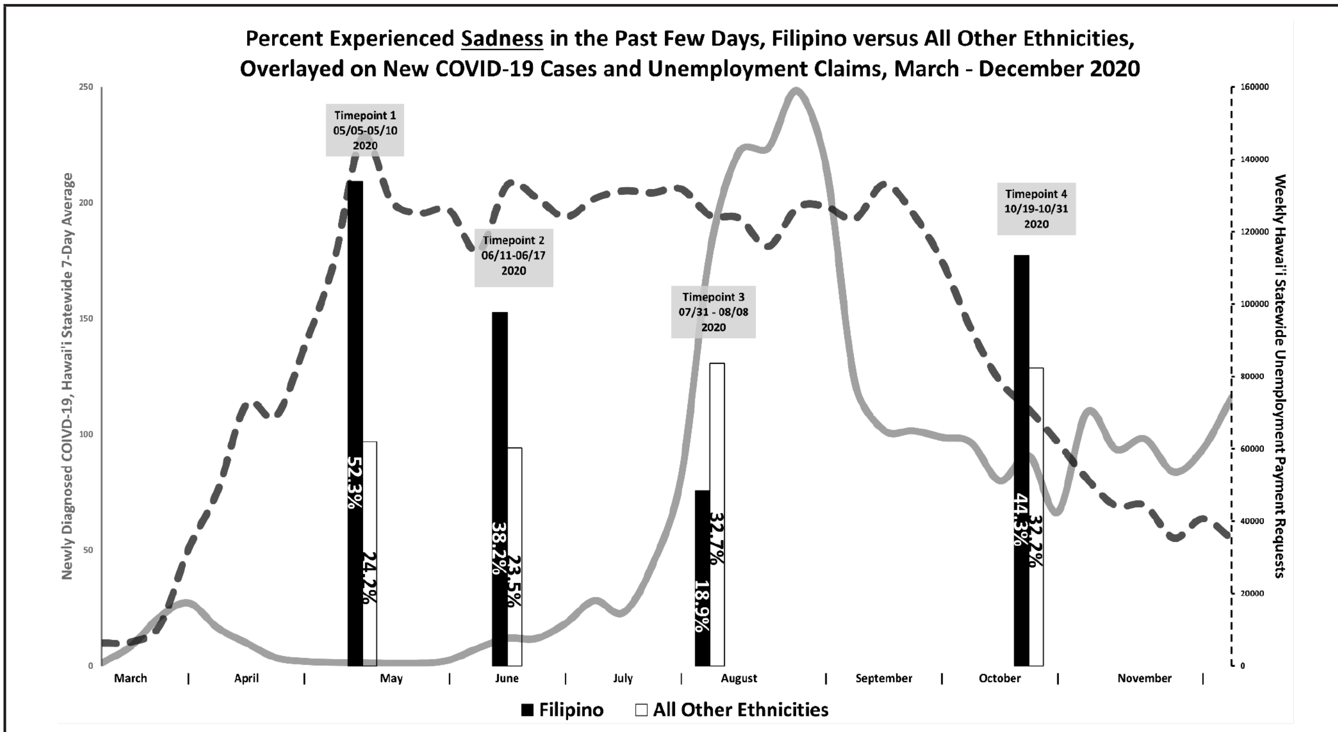

Figure 4. Sadness Indicator by New COVID-19 Cases (right y-axis, dotted line) and Unemployment Claims (right y-axis, dotted line) in Filipinos and All Other Ethnicities, March – October 2020

Discussion

The health and socioeconomic consequences of the pandemic have raised major concerns for mental health.[3–5,15] With the stress from high costs of living in Hawai'i exacerbated by the increase in COVID-19 cases and prolonged economic instability from the pandemic, we expected that the Filipino community would experience feelings of mental distress, which is suggested in our findings, in which many Filipino respondents reported feelings of sadness, stress, and worry, and economic uncertainty (eg, job loss, debt, and worry about food security).

Implications for Public Health Practice

COVID-19 highlights the importance of investing in social programs to protect mental health during economic downturns, especially for vulnerable populations.[5,15,17] Strengthening the mental health infrastructure in our state through increased availability of translated materials and culturally-relevant services would improve Filipinos' access to mental health services. Previous studies show that increasing availability of behavioral health services and expanding insurance coverage can potentially decrease racial and ethnic disparities in mental health outcomes.[24] Furthermore, additional research should be conducted into the mental health experiences of Filipinos related to the pandemic. The Filipino community is often aggregated under Asian Americans, and as a result, there is limited information about mental health treatment for Filipinos.[25] To provide better mental health care to Filipinos, it is important to understand the cultural values and experiences of the Filipino community.

Within the Filipino community, mental health should be addressed with culturally appropriateness. Mental health issues are stigmatized in Filipino culture and many Filipinos conceal their emotions and endure their emotional sufferings.[26] This may be due to the belief that mental illness signifies a weak spirit, and the cultural value of social harmony (*pakikisama*). These cultural beliefs can thus prevent Filipinos from seeking mental health services.[27] However, Filipinos also have strong cultural values that can positively affect one's mental health. For example, Filipinos have a strong sense of connectedness with their community (*kapwa*) and a sense of gratitude and doing good for the collective (*utang na loob*).[28] Adaptations of mental health services to incorporate Filipino cultural values, such as incorporating family or faith-based practices, may help to increase the acceptability of seeking mental health services.[29] Outreach initiatives and community partnerships with Filipino community leaders is crucial to building strong relationships with one's culture, sharing information about coping strategies, normalizing discussions about mental health.[28,30] For example, in light of the pandemic, the FilCom CARES project was mobilized to provide COVID-19 testing and vaccine services, along with COVID-19 education in Tagalog and Ilocano, to Filipino communities by collaborating with churches and radio stations to increase awareness about such services.[31] Initiatives like FilCom CARES provides an example of community collaboration and culturally-based services for the Filipino community.

This pandemic led to massive increases in unemployment claims, and unemployment often results in the loss in health insurance or enrollment in expensive COBRA coverage. Local partners and state agencies must improve and maintain care coordination to ensure that vulnerable communities, like Filipinos, can access health insurance and unemployment benefits. These navigation support efforts are especially important for those needing translated resources or interpretation assistance in Tagalog and Ilocano when applying for benefits. Social services, such as unemployment benefits or social welfare supports (eg, family support), have a protective effect on an individual's mental health,[32,33] and the expansion of these programs appears to mitigate negative impacts of economic downturns on population mental health.[17]

For more sustainable impacts, social/public policy action is needed to mitigate socioeconomic downturns and the associated mental health consequences. For example, employment and health policies should be established to protect working individuals and families during public health and other emergencies. Employers should provide comprehensive paid sick or COVID-19 leave to provide essential workers the necessary resources to address health- and life-related stressors. Furthermore, economic policies that ensure a safety net for workers during an economic crisis, such as basic income security, can mitigate the consequences of sudden economic insecurity.[34–37]

Limitations

This study utilized secondary cross-sectional aggregate data; without access to individual-level longitudinal data, thus the current study was unable to conduct inferential analyses between survey timepoints, nor quantitatively link unemployment claims or COVID-19 cases to the survey responses. As a result, our findings are purely descriptive, and we are unable to see if any of our data points are related in any way other than by time. Also, the survey indicators used in our analysis were proxy measures for mental health rather than robust indicators used in mental health screening instruments. While the indicators were used to describe possible symptoms of mental health issues such as anxiety and depression, they do not measure the severity nor duration of these symptoms.

Furthermore, the answers to the survey questions are self-reported from the panel of participants, which may be subjected to social-desirability bias. As mentioned previously, mental health concerns can be culturally stigmatizing amongst many Filipinos.[26] Therefore, the survey results may underrepresent the true proportion of Filipinos experiencing mental health concerns. Lastly, this study may not be representative of all Filipinos in Hawai'i. The survey was conducted in English using an online panel, which may fail to capture individuals who do not speak English or lack internet access. Moreover, respondents to the SMS Community Pulse survey were only able to choose one ethnic group such that those of two or more ethnicities would be categorized as 'other/mixed' or 'Hawaiian/Part-Hawaiian' depending on whether they were mixed with Native Hawaiian; therefore, the primary ethnicity identified by survey respondents may not adequately reflect their cultural background or identity.

Conclusions

This study expands on previous studies regarding COVID-19 and the Filipino community with a specific focus on mental health and the socioeconomic consequences of the pandemic, which appears to be lacking in the literature. Although no conclusions can be made based on this data, the findings provide a unique insight to mental distress and economic consequences that Filipinos may have experienced during the pandemic. The trends presented in our analysis indicate that Filipinos were more likely to experience mental distress during the pandemic. Thus, it is essential to expand behavioral health services and improve employment and health to prevent mental health crises from occurring in future public health emergencies. As the pandemic is currently ongoing, albeit recovering, future research is needed to examine the long-term effects of the pandemic and how it impacts the mental health of vulnerable communities, such as the Filipino community. It is hoped that this study can spark improved services and policies to protect vulnerable communities from further health and socioeconomic disparities.

Conflict of Interest

None of the authors identify a conflict of interest.

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Laying the Groundwork for Cultural Faculty Development Initiatives at the John A. Burns School of Medicine

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In 1993, the Medical School Hotline was founded by Satoru Izutsu PhD (former vice-dean UH JABSOM), it is a monthly column from the University of Hawai'i John A. Burns School of Medicine and is edited by Kathleen Kihmm Connolly PhD; HJH&SW Contributing Editor.

Abbreviations

CC = cultural competence
CCCS = Cross-Cultural Care Survey (CCCS)
C-CODE = Coordinating Committee on Opportunity, Diversity, and Equity
DEI = diversity, equity, and inclusion
DNHH = Department of Native Hawaiian Health
HBAS = Health Beliefs Attitudes Survey
JABSOM = John A. Burns School of Medicine
LCME = Liaison Committee on Medical Education
UHM = University of Hawai'i at Mānoa

Introduction

The University of Hawai'i at Mānoa's (UHM) commitment to being a Native Hawaiian place of learning and supporting students who are underrepresented in higher education has been threatened by the recent Supreme Court of the United States decision regarding affirmative action, and individual state legislation banning diversity initiatives in schools and universities.[1,2] UHM's John A. Burns School of Medicine (JABSOM) has a long history of supporting diversity, equity, and inclusion (DEI) efforts, which includes a priority to provide opportunities to underserved populations. More recently, to reinforce its commitment to DEI, the school has integrated an overarching theme in its strategic plan to "Enhance diversity and opportunities within each [strategic] goal in order to achieve equity in our JABSOM 'ohana and communities we serve."[3] This focus on diversity is in line with the requirements and commitment to the value of diversity in the learning environment by the Liaison Committee on Medical Education (LCME), the accrediting body for medical schools in the United States and Canada.

The LCME provides a set of standards, broken down into elements, which medical schools must meet to achieve and maintain accreditation. Although there is no specific standard for culturally-related faculty development initiatives, it is implied under Element 7.6 Structural Competence: Cultural Competence, and Health Inequities. This element states faculty are required to ensure that medical students are taught how to identify and account for implicit bias within themselves, others, and in the health care delivery system.[4] Element 7.6 further specifies that the curriculum include: information about the diverse manners that patients experience health and illness, including symptoms, diseases, and treatments; culturally and structurally competent health care; education on health care disparities and health inequities, including the impact of these disparities and how inequities can be reduced; and guidance on the overall attitude, knowledge, and skills needed to provide effective care in a "multidimensional and diverse society."

Currently, JABSOM does not mandate cultural training (eg, cultural competence [CC], DEI) for faculty members. Given JABSOM's mission and commitment to diversity, this lack of training needs to be addressed. This article provides a description of JABSOM's current cultural training for faculty, which is spearheaded by the UHM Department of Native Hawaiian Health (DNHH), and recommendations to help lay the groundwork for a schoolwide training program.

UHM Department of Native Hawaiian Health Cultural Training Efforts

JABSOM's faculty cultural training efforts are facilitated by the DNHH under its Native Hawaiian Center of Excellence.[5] On its website, the department reported it has provided a variety of trainings, which have included[6] :

(1) Weekly Hawaiian language classes;
(2) Monthly work in the JABSOM native plant garden (*Mala Lapa'au*) with lectures from a native plant consultant;
(3) Field trips to Makua Valley, Paepae He'eia (fishpond) and Waipao (cultural center with native plants, *lo'i kalo*);
(4) Yearly faculty weekend immersion experience; and
(5) Lecture series on Native Hawaiian medicine at the Bishop Museum (open to the public).

More recently, the department, along with JABSOM's Office of Faculty Affairs, has sponsored the annual Diversity Matters lecture series, which invites speakers on topics such as physician advocacy and the experiences of women in medicine (Lori Emery, email communication, August 2022). Additionally, with the support of The Queen's Health Systems, the department is developing "a prototype for an introductory curriculum for health care system employees (possibly others) to address topics of health equity and culturally safe provision of care through a Native Hawaiian orientation to health (Rebecca Delafield, email communication, August 2023)." As a leader in CC and DEI, the DNHH is available to share its expertise with those within and outside of JABSOM seeking assistance with cultural training efforts.

Lack of Standardized, Mandatory Training at JABSOM

In addition to the DNHH initiatives, individual JABSOM departments have developed their own trainings, but these efforts are largely for department members and not widely advertised to the larger JABSOM community. Cultural training activities have been self-reported by some departments in the JABSOM Cultural Competency Resource Guide, which was initiated by the UHM Department of Surgery in Spring 2008 to summarize JABSOM's cultural competency initiatives and programs into a centralized resource guide in order to increase communication and collaboration among JABSOM departments, offices, programs, and individuals.[7] Additionally, recent efforts to document these efforts have been addressed by JABSOM's Coordinating Committee on Opportunity, Diversity, and Equity (C-CODE), which is a standing committee of JABSOM that "supports institutional strategic priorities relevant to ODE [opportunity, diversity and equity] and provides enhanced coordination and communication for initiatives and activities related to diversity and inclusion."[8]

Additionally, lack of funding and staff support is a barrier to progress, despite the dean's office support of additional CC and DEI faculty development activities. The DNHH and other departments and programs need funding and staff support, especially if the training would be mandatory and long-term.

Recommendations

JABSOM could advance its efforts in cultural training for faculty by the implementing the following 3 steps:

(1) Identifying and contacting medical schools that have mandatory training;
(2) Confirming how cultural training is defined, standardizing content, and determining frequency for medical school faculty;
(3) Evaluating training efforts to ensure their efficacy.

Identifying and Contacting Medical Schools That Have Mandatory Training

Umehira et al's review identified medical schools that reported cultural training was mandatory for their medical school faculty.[5] For example, the University of Arkansas Medical Sciences College of Medicine requires all faculty to complete a cultural humility/implicit bias workshop annually; this program started in November 2020. It is a 1-hour workshop that introduces topics such as implicit bias and cultural humility, and explains how they affect education, health care, and the community. The University of North Carolina School of Medicine has mandated DEI training for all employees since March 2021. To advance JABSOM's efforts, these medical schools should be contacted to obtain insights into how the schools were able to mandate the training and explore how they overcame any obstacles involved with establishing training of such magnitude. Also, it is important to note whether there was institutional or systemic change in developing these programs. The literature notes the importance of creating an inclusive organizational culture, which includes intentional recruitment of a diverse workforce and providing adequate financial support for those engaged in these efforts.[9]

Confirming How Cultural Training is Defined, Standardizing Content, and Determining Frequency

Most trainings by DNHH and other departments have largely been focused on race/ethnicity, but JABSOM's C-CODE recognizes this definition needs to become more inclusive. Culture has been described in health care as caring for "patients who are members of a culture different from your own."[10] Under a broader definition, culture includes gender/gender identity, religion, disabilities, socio-economic status, and other demographic characteristics. This raises a number of questions relating to CC/DEI faculty development programs: How is content managed? What is the adequate amount of content so that faculty participating in the training are not overwhelmed? How often should the training be offered?

The literature documents that longitudinal training is beneficial, and highlights "the needs beyond mere integration of cultural competence content into the formal curriculum."[11] For example, the current evidence supports the idea that generating conversation and promoting discussions about culture is one of the most valuable methods of training. Open discussions can enhance awareness and tolerance, and may also allow for the exploration of numerous perspectives, which can promote faculty engagement and interest in CC. Furthermore, in order for CC to become standard in medical curricula, it is important that medical schools and their stakeholders recognize CC as a core component of medical education.[12] Emphasizing this issue at the organizational level may encourage schools to make faculty CC training mandatory, while fostering a deeper commitment toward learning CC among students, educators, and the larger health care community.

A model program can improve the quality of teaching as well as positively alter clinical behaviors and practices. An early study by Ferguson et al laid the foundation for integrating future faculty development initiatives in medicine that focus on CC.[13] Researchers examined the integration of a faculty CC curriculum program from 15 medical schools in the Northeastern United States from 1999 to 2001. Described as the "first such faculty development curriculum," the Teaching the Culture of the Community program included 4, 2.5-hour modules of interactive lectures, small-group role-play activities pertaining to cultural needs, patient-centered interviewing, and feedback on cultural issues. Upon evaluation of the program in 2001, the researchers revealed several positive findings. First, there was a statistically significant improvement in the way faculty valued the program; there was also greater clarity in the program's objectives in the second year. Second, faculty participants intended to change their teaching practices and behaviors because of the program. And third, changes made to the CC curriculum between 1999 and 2001 were beneficial in the way faculty received the program. Such changes were made in 3 specific categories: the minimization of jargon, clarity of objectives, and refinement of cases for discussion.

Researchers found that these 3 modifications yielded interesting results. Regarding the minimization of jargon, they noted that the use of a broad definition of culture "countered the assumption that cultural competence is only an issue for physicians providing care to diverse ethnic and racial populations." Next, faculty participants questioned the wisdom of the large time commitment for the training less as they became more comfortable with teaching the curriculum. Further, participants reported they benefited from additional training and concept reinforcement in their commitment to changing their behaviors in clinical care and teaching. Researchers concluded that the integration of this program with existing faculty development was successful.

Evaluating Efforts to Ensure Its Efficacy

Another problem that has plagued cultural training efforts is the lack of outcome data on its efficacy. Standardized, validated tools to evaluate cultural training are not frequently reported in the literature, but there are promising tools available, such as the Cross-Cultural Care Survey (CCCS) and the Health Beliefs Attitudes Survey (HBAS).[14] The CCCS was designed to assess residents' self-perceived preparedness and skillfulness in providing care to patients from cultures different from their own. The HBAS was designed to measure the efficacy of cultural training for medical students. Both surveys have been adapted for use with other groups, including faculty.

Accordingly, JABSOM needs to ensure that longitudinal evaluation coincides with the longitudinal training. One example of an attempt to evaluate efficacy of cultural training efforts was documented by Kumagai and Lypson, who analyzed CC at the University of Michigan Medical School. Using multiyear, longitudinal surveys, the researchers investigated how CC goes beyond the scope of traditional medical school curricula, which focuses heavily on critical thinking, analytical skills, evaluation, and logic. Instead, researchers discussed how mastering CC skills allows students to effectively understand and become proficient in these traditional qualities. They explored faculty development initiatives in multicultural education through small-group discussions, learning, and facilitation workshops, as well as other methods, such as interactive theater.[15] They also investigated the evaluation of multicultural education and concluded that the most advantageous evaluation methods would be through longitudinal small-group activities and interpretive projects. Integrating these initiatives proved beneficial for students and faculty. The authors noted the disconnect between diversity and the underlying idea of social justice in health care, and suggested ways to address this issue moving forward.[16]

Conclusion

The integration of faculty-specific CC/DEI training in medicine continues to be a work in progress. Faculty development is vital when considering the evolution of health care and the increasing need to improve patient care in response to a growing, diverse global population. Few faculty development initiatives in CC/DEI exist to achieve this vision, despite the fervent call to action to address racial disparities after the murder of George Floyd in May 2020. Such events have raised awareness of the importance of CC/DEI and acknowledge the need to improve medicine in this respect. Therefore, JABSOM and other medical schools must find ways to provide faculty development within the current climate. A blueprint for action must evaluate past and ongoing research of program models, express effective strategies and approaches to CC/DEI developments, detail formal goals and assessments using credible measurements, and emphasize the necessity for medical faculty to be qualified and confident to educate, as well as manifest the behaviors in clinical environments.

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Insights in Public Health

Database Versus Patient - Things to Consider when Utilizing the Hawai‘i Prescription Drug Monitoring Program

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Insights in Public Health is a recurring column from the public health community and is coordinated by HJH&SW Contributing Editor Mapuana Antonio DrPH from the Office of Public Health Studies in the Thompson School of Social Work & Public Health at the at the University of Hawai‘i at Mānoa and Contributing Editor Nichole J. Fukuda MS from the Hawai‘i Department of Health.

Abbreviations

AMA = against medical advice
HI-HIDTA = Hawai‘i High Intensity Drug Trafficking Areas
HI-PDMP = Hawai‘i prescription drug monitoring program
PDMPs = prescription drug monitoring programs
SUD = substance use disorders

Introduction

Substance use has cost the United States billions of dollars.[1] According to Zhang et al,[2] 11.1% of patients who visit the emergency department have substance use disorders (SUD), highlighting the importance of recognizing SUD as risk factors for increasing morbidity amongst acutely ill and injured patients. In Hawai‘i, the estimated cost of each opioid-related overdose is $4 050 per emergency department visit and $40 100 for each hospitalization.[3]

Patients with SUD are approximately 3 times more likely to leave the hospital against medical advice (AMA) as compared to those without SUD. Patients leaving AMA often result in uneconomical use of resources through repeated emergency room visits and readmissions. For patients who leave AMA, the risk of readmission is more than doubled and their subsequent length of stay in the hospital after readmission is almost doubled as well; the overall cost for patients who leave AMA is 56% higher than it is for patients who leave on their planned discharge date.[4,5] One of the major reasons SUD patients leave AMA is undertreated withdrawal,[4] which includes not being given sufficient outpatient maintenance prescribed controlled medications.

According to the Centers for Disease Control and Prevention, the total number of drug overdose deaths quintupled between 1999 and 2020. The age-adjusted death rate from overdoses increased from 28.3 per 100 000 in 2020 to 32.4 per 100 000 in 2021. Except for those aged 15–24, drug overdose death rates in 2021 were significantly higher than those in 2020 for all age groups.[6-8] Similar to national trends, Mr. Gary Yabuta, the Executive Director of Hawai‘i High Intensity Drug Trafficking Areas (HI-HIDTA) reported that drug related deaths in Hawai‘i increased from 249 in 2016 to 320 in 2022.[9] In 2021, Hawai‘i had 269 overdose deaths, approximately 17.3 overdose deaths per 100 000 people (age-adjusted).[10]

From 1999 to 2017, the number of overdose deaths involving prescription opioids rose by almost 500% in the United States.[8] There was a temporary decline in prescription opioid overdose deaths between 2017 and 2019, but in 2021, the deaths increased, accounting for approximately 15.7% (16 706) of all drug overdose deaths in the United States.[8] When compared to other parts of the country, Hawai‘i has a lower rate of overdose deaths involving opioid prescription medications.[11] Data from HI-HIDTA show that there were 24 prescription opioid medication related deaths in 2020.[12]

Unfortunately, overdose deaths usually involve multiple substances, hence identifying the exact substance causing a person’s death can be very challenging. Indeed, instead of “opioid overdose death crisis,” the proper terminology may be “polysubstance overdose death crisis.” For example, both illicit and common substances such as alcohol and prescription sedative medications (such as benzodiazepines, which are one of the most commonly prescribed controlled medicines) may be involved in prescription opioid deaths.[13] Although both opioids and benzodiazepines are prescription medications, combining them can increase the risk of an overdose because both types of drugs can cause respiratory suppression, leading to fatality.[14]

Prescription drug monitoring programs (PDMPs) have been enacted across the United States in an effort to combat the ongoing overdose death crisis and to protect the public. PDMPs are statewide electronic databases that tracks controlled medication prescriptions. The program allows health care providers to access information about patients’ controlled medication prescriptions in order to provide optimal and safe medical care.[15] Although the impact and effectiveness of PDMPs remain mixed,[15] in 2015 the National Heroin Task Force[16] found that PDMPs reduce doctor shopping behaviors amongst patients and reduce rates of unhealthy use of prescription medications. PDMPs have also been shown to impact prescribing behaviors in an emergency setting, sometimes resulting in no, or fewer, opioid pill prescriptions.[17] As of January 2023, all 50 states, Washington D.C., and Guam have PDMPs.[18]

Despite the benefits associated with PDMPs, there are multiple barriers to the success of the program. For example, the usage and regulation of PDMPs vary widely between states. In some states, prescribers are mandated by law to check the PDMPs before prescribing controlled medications, whereas in others, it is voluntary.[19] Unfortunately, PDMP data are not shared across the country and data sharing policies vary between each state and jurisdiction.[20] PDMPs are not a comprehensive system, as the databases do not collect the method of payment used to fill the prescription, the identification of the person filling the prescription medications, or the disciplinary status of prescribers. There is also variable lag time between filling prescriptions and reporting to PDMPs.[21] Other barriers to success of PDMPs identified by Martin et al[22] include difficulties accessing PDMPs, lack of knowledge or awareness of PDMPs, and lack of electronic medical record integration.

The Hawai‘i PDMP (HI-PDMP) became operational in 1943 and became accessible online in 1997.[23] As of 2018, per Act 153(18), prescribers are required to consult the HI-PDMP before prescribing any schedule II-IV controlled substances, with the exception of prescriptions for a supply of up to 3 days made by an emergency medical provider or in an emergency room.[24] As of September 2023, the HI-PDMP shares data with 13 states plus military health systems.[25]

Considerations when Utilizing the HI-PDMP

Providers should consider a few important facts when utilizing the HI-PDMP. When searching for a particular patient in the HI-PDMP, there may not be a result for several reasons. First, the HI-PDMP is not updated in real time, sometimes resulting in up to a 7-day delay between when prescriptions are filled and when they are reported to the PDMP. Second, the HI-PDMP only includes prescriptions that are dispensed within the state of Hawai‘i. Third, controlled substances dispensed to inpatients in hospitals and nursing homes, as well as those administered at a health care facility are exempted from reporting to the HI-PDMP.[26] Fourth, the HI-PDMP and electronic health records are not integrated. And finally, as previously stated, Hawai‘i shares PDMP data with a select number of states.[25]

Despite various laws and regulations intended to keep Hawai‘i safe, the HI-PDMP may at times become an obstacle to providing proper care. In a recent situation, the HI-PDMP flaws were the reason a patient was denied medication and eventually left AMA. A patient with a history of SUD insisted on being prescribed controlled medication as an outpatient. At that time, the patient did not have any acute medical indication for such medication or objective signs or symptoms of withdrawals. The hospital provider checked the HI-PDMP but there were no such encounters recorded, resulting in the medication not being prescribed. Days later, after the patient pleaded multiple times, the provider called the outpatient office and pharmacy which both confirmed the prescription. The pharmacy was not aware that the patient's prescription was not in the HI-PDMP because they had been relying on third parties to input the data. By this time, the patient had already left the hospital AMA out of frustration and necessary medical treatment was not completed. Although there were no acute indications or objective withdrawal symptoms observed in this case, many SUD patients suffer from strong cravings. These cravings may lead to maladaptive behaviors, such as leaving the hospital AMA.[4]

The above case demonstrates the discordance between the HI-PDMP and the patient's reported history. Although the health care provider checked the HI-PDMP prior to prescribing the controlled substance as required by law, the patient unfortunately left AMA. Prior to mandatory consultation with the HI-PDMP, health care providers often called the outpatient provider or pharmacy to confirm the patient's story because not all providers were aware of, or had access to the HI-PDMP. Although the HI-PDMP is convenient and provides valuable information, it is important for health care providers to keep in mind that the HI-PDMP has limitations. When there is a discrepancy between a patient's account and the HI-PDMP, the provider should gather more information so that optimal care can be provided.

Conclusion

More than 45 people in the United States die daily from prescription opioid medications.[8] Unfortunately, overdose deaths also commonly involve other illicit and prescription substances, such as benzodiazepines.[13] PDMPs are convenient tools which were enacted across the United States with the intention to keep the public safe and healthy. They also allow health care providers to access information on patients' controlled medication prescriptions. Laws and regulations pertaining to PDMPs were created in an effort to combat the ongoing opioid overdose death crisis, or more specifically, polysubstance overdose death crisis. Although results are mixed, studies show that PDMPs reduce doctor shopping amongst patients and reduce the rates of unhealthy prescription drug use.[15,16,17] It also appears to have a positive impact on physician prescribing habits.[17] In Hawai‘i, the law mandates that health care providers consult the HI-PDMP prior to prescribing controlled medications.[24] Although the HI-PDMP provides valuable information, it is important for providers to be aware that no system is perfect. To provide optimal health care for patients and to keep Hawai‘i safe, providers should be aware of the HI-PDMP's limitations and take extra steps when necessary to confirm the patient's story when there are discrepancies with the PDMP data. A few additional steps may prevent patients from leaving AMA and ensure delivery of proper care and judicious utilization of public resources.

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Hawai‘i Journal of Health & Social Welfare Style Guide for the Use of Native Hawaiian Words and Diacritical Markings

The HJH&SW encourages authors to use the appropriate diacritical markings (the ‘okina and the kahakō) for all Hawaiian words. We recommend verifying words with the Hawaiian Language Dictionary (http://www.wehewehe.org/) or with the University of Hawai‘i Hawaiian Language Online (http://www.hawaii.edu/site/info/diacritics.php).

Authors should also note that Hawaiian refers to people of Native Hawaiian descent. People who live in Hawai‘i are referred to as Hawai‘i residents.

Hawaiian words that are not proper nouns (such as keiki and kūpuna) should be written in italics throughout the manuscript, and a definition should be provided in parentheses the first time the word is used in the manuscript.

Examples of Hawaiian words that may appear in the HJH&SW:

‘āina	**Kaua‘i**	**O‘ahu**
Hawai‘i	**Lāna‘i**	**‘ohana**
kūpuna	**Mānoa**	**Wai‘anae**

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