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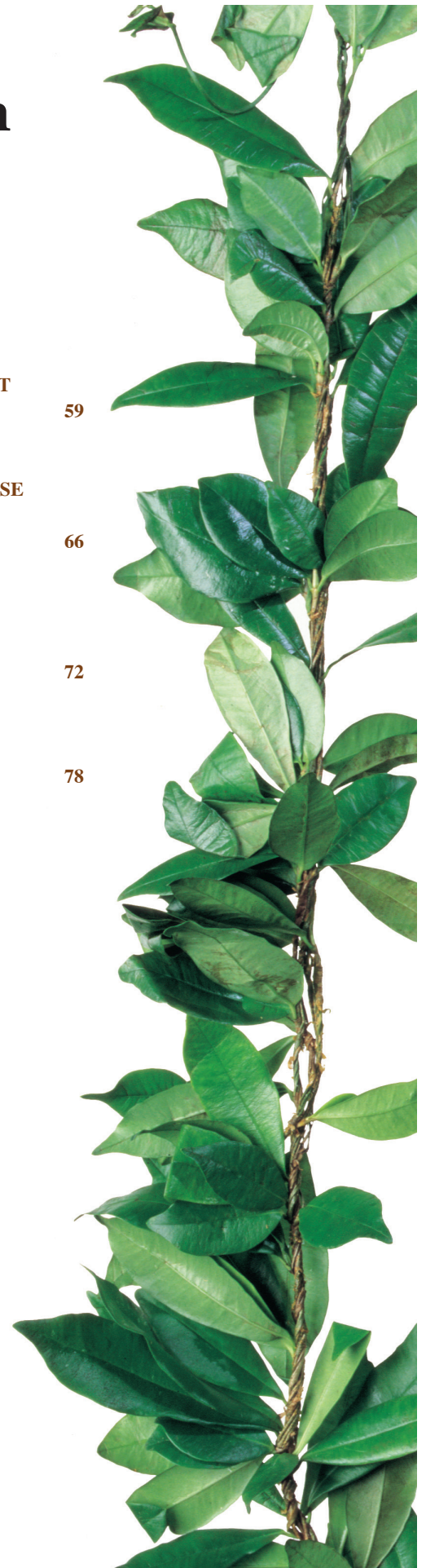
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COVID-19 had Limited Impact on Resumption of Elective Joint Arthroplasty and Ethnic Disparities

Krystin Wong BA; Samantha N. Andrews PhD, ATC; Cass K. Nakasone MD

Abstract

In response to the COVID-19 pandemic, federal and state recommendations included the postponement of elective arthroplasties until adequate safety measures could be implemented. Following resumption of arthroplasties, exposure fears and financial concerns may have restricted access for some demographics. Therefore, the purpose of this study was to (1) investigate how the COVID-19 pandemic impacted the incidence of arthroplasty, both overall and by various demographics, and (2) evaluate if pre-operative patient-reported measures were different throughout the pandemic. Data were collected prospectively as part of an on-site joint registry between January 2019 and April 2021. Phase 1 (N=518) included all patients prior to the cancelation of elective procedures (average 36 cases/month), Phase 2 (N=121) was defined from restart until monthly caseload met/surpassed the average Phase 1 caseload (5 months), and Phase 3 (N=277) included all remaining cases. Multiple analysis of variance and chi-squared tests were performed to compare patient demographics and outcomes between phases. No significant differences were noted in patient demographics, with the exception of a decrease in Native Hawaiian/Pacific Islander patients and an increase in Asian patients during Phase 2 ($P = .004$). Length of stay decreased for unilateral arthroplasty from Phase 1 (0.9 ± 1.1 days) to Phase 2 (0.4 ± 0.6 days) and Phase 3 (0.6 ± 0.7 days) ($P < .001$), while pre-operative patient reported outcomes remained similar across the 3 time periods. By implementing proper safety measures, the current orthopedic center achieved a timely recovery with no long-lasting inconsistencies in patient cohorts upon resumption of arthroplasties.

Keywords

Pandemic; Access; Arthroplasty; Ethnicity; Outcomes

Abbreviations

ASA = American Society of Anesthesiology

BMI = Body Mass Index

CMS = Centers for Medicare and Medicaid Services

GPH = Global Physical Health

GMH = Global Mental Health

HOOS JR = Hip Disability and Osteoarthritis Outcome Score, Joint Replacement

KOOS JR = Knee Injury Osteoarthritis Survey, Joint Replacement

LOS = Length of Stay

NH/PI = Native Hawaiian/Pacific Islander

Introduction

The spread of the COVID-19 virus across the country and throughout the world has greatly impacted health care systems and interrupted delivery of elective hip and knee joint arthroplasty. With efforts to minimize viral transmission and conserve hospital resources, the American College of Surgeons, Centers for Medicare and Medicaid Services (CMS) and state regulations recommended postponing or canceling nonessen-

tial surgeries beginning in March 2020,¹ with reimbursement losses estimated at \$17.0 billion per month.² It was estimated that approximately 30 000 primary and 3000 revision hip and knee elective arthroplasties would be canceled nationally each week³. These CMS regulations were updated in April 2020 and allowed states or regions that met specific safety criteria regarding facilities and case numbers to resume essential, non-COVID-19-related care.⁴

The hospital at the current study site resumed elective procedures in May 2020 following a state-wide decrease and stabilization in COVID-19 cases, along with the implementation of safety standards including adequate personal protective equipment, staffing, available testing and sanitation protocols.⁵ Even after procedures were permitted to resume, several factors may have influenced patients' decisions to reschedule surgery during the height of a pandemic. Perhaps most notably may have been the perceived risk of contracting the virus and the potential for an increased risk of serious complication due to age, race, or pre-existing comorbidities. Additionally, with an average of 11 100 unemployment claims filed per week in May and a peak average of 30 400 claims filed per week in the prior month of April, loss of insurance, and additional financial burdens may have limited patient access to surgery.⁵ Despite these barriers, the severity of osteoarthritis and its impact on quality of life and function remained significant burdens to patients in need of surgery. This is especially important since delaying surgery has been shown to increase post-operative opioid use, lower clinical results and satisfaction, increase readmission rates, and prolong work absences.⁶

The influence of canceling months of elective procedures may be felt for years to come, and it is unknown how the pandemic has affected both provider ability to equitably serve the osteoarthritic patient population and patient access to receiving necessary treatment. Therefore, the purpose of this study was to (1) report the number of months for arthroplasty caseload to return to pre-pandemic levels, (2) compare pre- and post-shutdown patient demographics, and (3) evaluate if pre-operative patient-reported measures were different throughout the pandemic.

Materials and Methods

This was a secondary analysis of prospectively collected data for an on-site, Western Institutional Review Board approved joint registry. Patients having undergone elective joint arthroplasty by a single, fellowship trained orthopedic surgeon between

January 2019 and April 2021 were included in the final data analysis. During the study period, elective procedures were cancelled from mid-March 2020 to May 2020; therefore, 517 consecutive patients were evaluated prior to the shutdown (Phase 1) and 398 consecutive patients following the restart of elective procedures. The clinic “recovery” following the shutdown (Phase 2) was defined from surgery restart to when the monthly caseload surpassed the average caseload reported for Phase 1; the remaining cases would be designated as Phase 3. As recommended by the American Association of Hip and Knee Surgeons⁷, all patients completed 2 patient reported outcomes pre-operatively: (1) hip disability and osteoarthritis outcome score, joint replacement (HOOS JR) or knee injury osteoarthritis outcome survey, joint replacement (KOOS JR) for hip and knee arthroplasty, respectively, and (2) Patient-Reported Outcomes Measurement Information System® from which Global Physical Health (GPH) and Global Mental Health (GMH) were determined. Following the restart of elective procedures, pre-operative instructional group classes were transitioned to an individual telephone call. Therefore, if no surveys were on file within the last 6 months, the patient was either mailed a survey or the survey was completed over the phone with a member of the orthopedic staff.

Self-identified ethnicity at the time of surgery was collected and classified as Asian, Native Hawai‘i/Pacific Islander (NH/PI), White, and Other/Not Disclosed. Patient demographics, including age, gender, and body mass index (BMI), and hospital length of stay (LOS) were collected during a manual chart review. Comorbidities were summarized by American Society of Anesthesiologist (ASA) category, as assigned by a core group of experienced anesthesiologists as part of the Perioperative Surgical Home.⁸ Patient insurance was also collected and categorized as (1) Medicare, (2) Medicaid, (3) Private and (4) Other. Descriptive statistics, including mean, standard deviations and frequencies, were determined for each Phase. Continuous and categorical variables were evaluated by multiple analyses of variance (ANOVA) and Chi-Squared tests, respectively, with a significance level of $P < .05$. For significant ANOVA main effects, a pairwise post-hoc analysis was performed with a Bonferroni correction. The effect size was calculated by eta

squared (η^2) tests for significant ANOVA main effects. All statistical analyses were performed on IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY) with a significance level of $P < .05$.

Results

The number of primary arthroplasty cases per month is presented in **Figure 1**. The average monthly caseload in 2019 was 36 patients per month. The clinic returned to a comparable caseload of 37 patients during September 2020, marking the end of Phase 2. Overall, there were 517 patients (376 unilateral and 141 bilateral) in the Phase 1 cohort (January 2019 to March 2020), 121 patients (93 unilateral and 28 bilateral) in the Phase 2 cohort (May 2020 to September 2020), and 277 patients (199 unilateral and 78 bilateral) in the Phase 3 cohort (October 2020 to April 2021). No significant differences in age, gender, BMI, or ASA score were found between the 3 groups ($P > .05$) (**Table 1**). There was a significant difference in ethnicity between time periods ($P = .004$), with a decrease in the proportion of NH/PI patients from Phase 1 to Phase 2. Length of stay for unilateral joint arthroplasty was significantly different ($P < .001$; $\eta^2 = 0.20$), with Phase 2 ($P < .001$) and Phase 3 patients ($P = .001$) having a shorter length of stay. No difference in LOS was seen for patients undergoing bilateral procedures. Additionally, there was no difference in insurance payor type between the 3 groups ($P = .53$).

Apreliminary analysis was conducted to determine if differences existed between unicompartmental knee arthroplasty (UKA) and total knee arthroplasty (TKA) patient reported outcomes. There were no group differences in KOOS JR score during Phase 1 ($P = .062$), Phase 2 ($P = .22$) and Phase 3 ($P = .90$) or for the GPH ($P > .53$) or GMP ($P > .55$). Due to the lack of significant differences, UKA and TKA patient reported outcomes were combined. Self-reported pre-operative scores for HOOS JR/ KOOS JR, GPH and GMH are presented in **Figures 2-4**, with means and standard deviations presented in **Table 1**. There were no differences in pre-operative HOOS Jr ($P = .42$) or KOOS Jr (TKA, $P = .55$; UKA, $P = .13$) scores across the 3 periods. There were also no differences in GPH ($P = .38$) or GMH ($P = .08$) between the time periods.

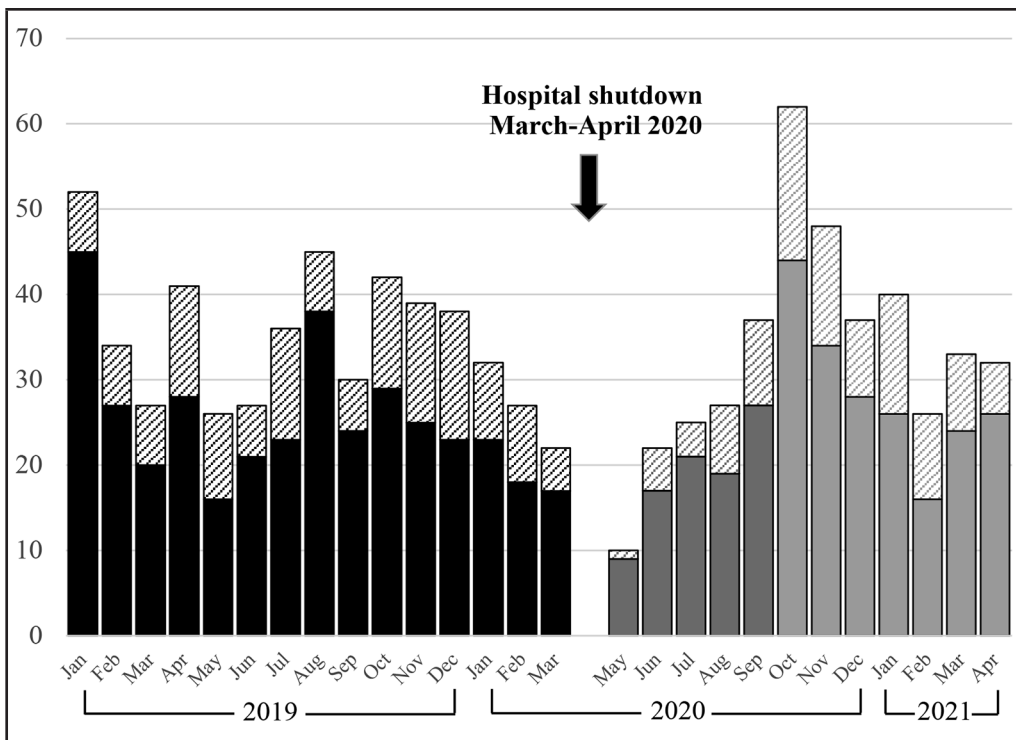


Figure 1. Total Number of Patients Receiving Arthroplasties by Month
 Black bars = prior to the shutdown (Phase 1); Dark Gray bars = Phase 2, immediately following resumption of cases;
 Gray bars = Phase 3. Solid bars = unilateral arthroplasty; Lined bars = bilateral arthroplasty

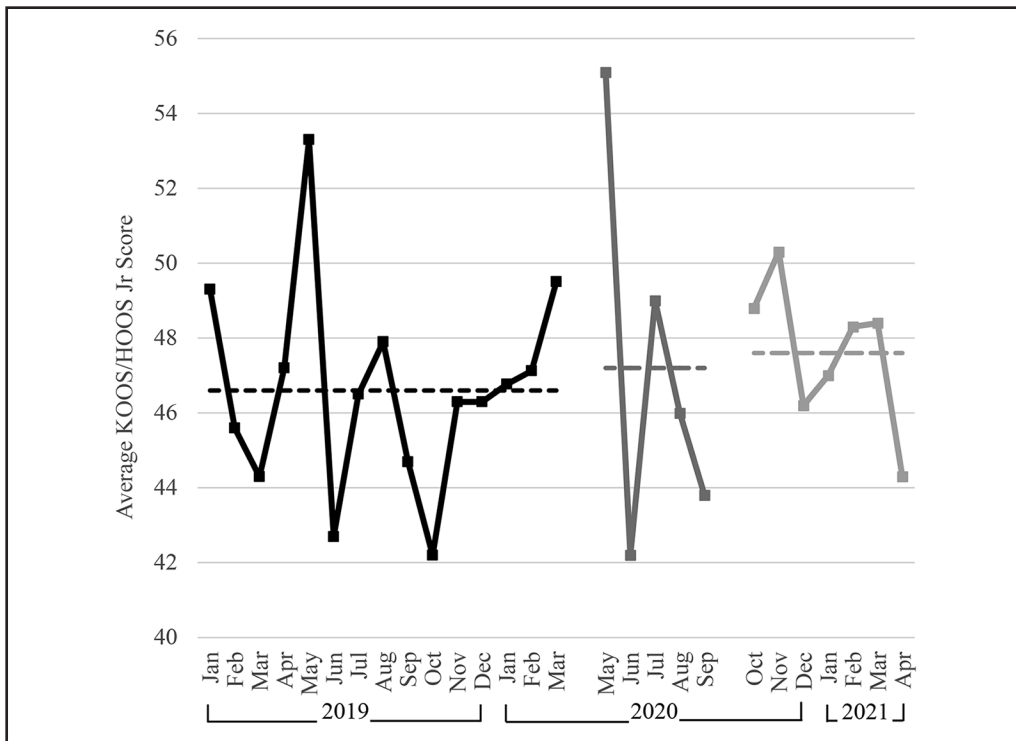


Figure 2. Average Pre-operative HOOS Jr and KOOS Jr Scores by Month for Hip and Knee Arthroplasties, Respectively
 Black = Phase 1, prior to shutdown; Dark Gray = Phase 2, following reopening; Gray = Phase 3.
 Dotted lines indicate the average scores over each respective time frame.

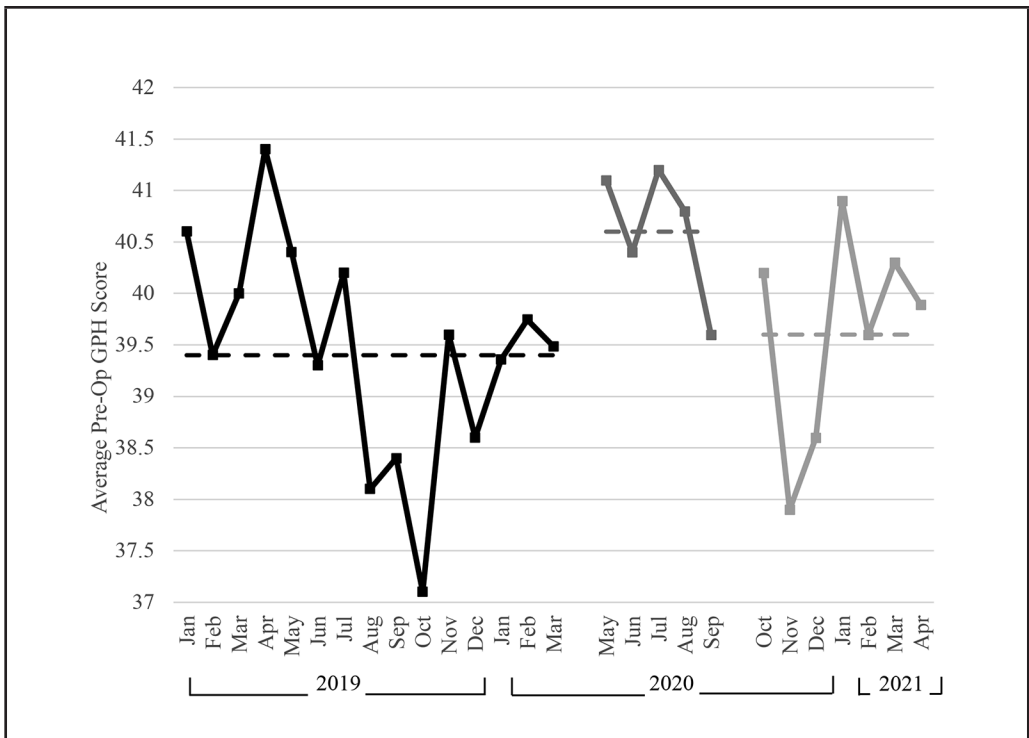


Figure 3. Average Pre-operative Global Physical Health (GPH) Scores by Month

Black = Phase 1, prior to shutdown; Dark Gray = Phase 2, following reopening; Gray = Phase 3.
Dotted lines indicate the average scores over each respective time frame.

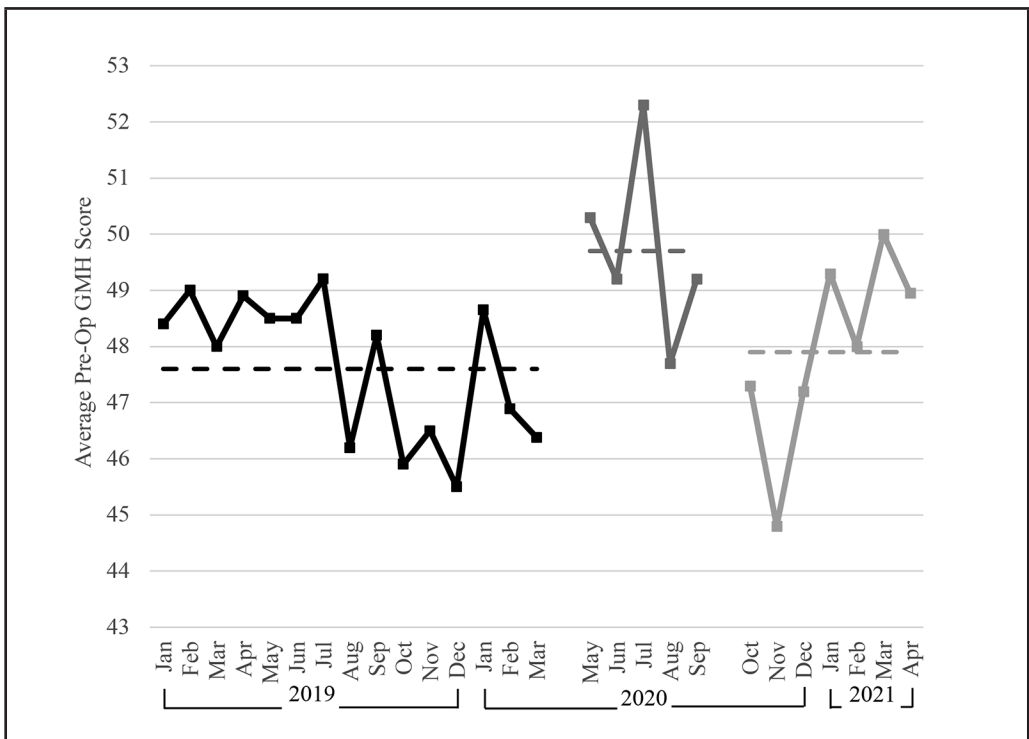


Figure 4. Average Pre-operative Global Mental Health (GMH) Scores by Month

Black = Phase 1, prior to shut down; Dark Gray = Phase 2, following reopening; Gray = Phase 3.
Dotted lines indicate the average scores over each respective time frame.

Table 1. Comparison of Elective Joint Arthroplasty Patient Demographics for Phases 1 through 3 - Mean (SD)				
	Phase 1	Phase 2	Phase 3	P-value
Number of Patients (n)	517	121	277	
	Frequency (%)	Frequency (%)	Frequency (%)	
Bilateral	141 (27.3%)	28 (23.1%)	78 (28.2%)	.57
Age	68.4 (9.0)	68.9 (8.9)	68.1 (9.3)	.693
Gender (Male)	257 (49.7%)	64 (52.9%)	147 (53.1%)	.527
Body Mass Index ^a	29.0 (5.6)	28.0 (5.5)	28.9 (5.4)	.198
ASA >2	303 (58.6%)	61 (54.5%)	152 (57.8%)	.723
Ethnicity				
Asian	273 (52.8%)	70 (57.9%)	131 (47.3%)	.004
White	161 (31.1%)	35 (28.9%)	99 (35.7%)	
NH/PI	60 (11.6%)	7 (5.8%)	19 (6.9%)	
Other	23 (4.6%)	9 (7.4%)	28 (10.1%)	
Insurance				
Medicare	311 (60.2%)	75 (62.0%)	159 (57.4%)	.529
Medicaid	18 (3.5%)	4 (3.3%)	11 (4.0%)	
Private	184 (35.6%)	41 (33.9%)	100 (36.1%)	
Other	4 (0.8%)	1 (0.8%)	7 (2.5%)	
Procedure				
UKA	110 (21.3%)	36 (29.8%)	36 (13.0%)	.002
TKA	197 (38.1%)	43 (35.5%)	114 (41.2%)	
THA	210 (40.6%)	42 (34.7%)	127 (45.8%)	
	Mean (SD)	Mean (SD)	Mean (SD)	
Length of Stay				
Unilateral	0.9 (1.1)	0.4 (0.6)*	0.6 (0.7)*	<.001
Bilateral	1.7 (1.6)	1.2 (0.6)	1.5 (1.4)	.266
Pre-Op PRO				
UKA - KOOS JR	50.5 (11.9)	45.8 (17.4)	46.5 (14.6)	.131
TKA - KOOS JR	44.7 (14.9)	46.7 (11.8)	46.3 (15.0)	.553
THA - HOOS JR	47.4 (15.0)	44.5 (17.9)	48.4 (17.7)	.418
GPH	39.6 (6.4)	40.5 (5.9)	39.6 (6.9)	.374
GMH	47.8 (8.5)	49.7 (9.1)	47.7 (8.9)	.077

^a Mean (SD)

SD = standard deviation; ASA = American Society of Anesthesiology; Op = operative; PRO = patient reported outcome; UKA = unicompartmental knee arthroplasty; TKA = total knee arthroplasty; THA = total hip arthroplasty; KOOS JR = knee injury osteoarthritis outcome survey, joint replacement; HOOS JR = hip disability and osteoarthritis outcome score, joint replacement; GPH = global physical health; GMH = global mental health; * = significantly different than pre-shutdown, $P \leq .001$

Discussion

The COVID-19 pandemic prompted many healthcare facilities to postpone non-essential treatment, which halted the delivery of care for elective joint arthroplasty. While the orthopedic center at the current study site was able to return to its usual procedural caseload within just 5 months of reopening, discrepancies between pre- and post-shutdown populations, if present, could indicate that COVID-19 had an inequitable effect on certain demographics regarding elective joint arthroplasty. Therefore, this study aimed to investigate whether any discrepancies existed in the demographic make-up and pre-operative condition of patients seeking operative treatment during Phase 2 and Phase 3. The results of the current study showed no concerning inconsistencies across these periods, suggesting that the current orthopedic center was able to achieve a timely recovery and serve a population comparable to the one seen prior to the pandemic.

While the demographic breakdown across the 3 time periods was generally consistent, the current study did find a slight decrease in NH/PI patients returning for surgery in the initial months after reopening. This downward trend was likely a consequence of the ethnic disparities in COVID-19 rates seen in the state of Hawai'i. Statewide statistics demonstrated that Native Hawaiian and Pacific Islander populations each comprised 20% of the COVID-19 cases.⁹ The number of positive cases potentially represents a greater exposure risk, as multi-generational or multi-family member households are common in these populations. Furthermore, while only constituting 4% of Hawai'i's population, Pacific Islanders accounted for 28% of the state's COVID-19-related hospitalizations, surpassing that of any other ethnicity.¹⁰ These high hospitalization rates represent a greater susceptibility to severe symptoms, likely attributed to a greater prevalence of chronic diseases.⁹ The disproportionate representation of cases and hospitalizations in NH/PI populations may have created hesitation in returning to health care facilities and a willingness to delay surgery due to the perceived risk of COVID-19 and subsequent complications. The increasing number of NH/PI patients in Phase 3, trending back towards pre-pandemic proportions, was encouraging, as proper safety precautions and patient messaging limited significant exacerbation of demographic disparities in patient access to elective joint arthroplasty.

In addition to the demographics mentioned above, insurance payor was a key area of interest in this study given the large spikes in unemployment claims filed in the state of Hawai'i, specifically preceding the month when elective surgeries resumed. However, the results showed no differences in the proportion of private to public insurance payors between the 3 patient cohorts. This is consistent with the fact that the average age of patients receiving surgery during the pandemic remained above 65 years and reflects the prevalence of Medicare coverage, which would not be affected by changes to employment status. However, these results do not dismiss the possibility of

other pandemic-related financial barriers influencing patients' decisions to seek surgery.

This study also examined pre-operative patient-reported outcomes to assess arthritis severity and overall health. The average pre-operative HOOS Jr and KOOS Jr scores did not differ between the 3 phases, suggesting that patients choosing to undergo surgery during these 3 time periods were similar regarding pain and self-perceived function. Although not statistically significant, the GPH and GMH scores appeared slightly higher than average for patients choosing to undergo surgery during Phase 2. This may indicate that slightly higher-functioning, healthier, or more confident patients were more willing to return sooner for surgery despite fears associated with the pandemic. However, in Phase 3, GPH and GMH scores returned to similar levels reported before the pandemic shutdown began. With previous studies showing correlations between pre-operative mental health scores and functional outcomes following arthroplasty surgery, it is important to evaluate the mental health of patients scheduled for elective joint arthroplasty, especially during the ongoing pandemic.¹¹

There are several limitations to this study. First, no record was available of patients invited to reschedule surgery when the hospital resumed elective arthroplasty cases. Thus, these results were based solely on the patients who elected to proceed with surgery. It is unknown how many patients declined surgery and whether their reason was related to the pandemic. Second, current insurance payor was the only tool used to estimate unemployment status. However, those who lost insurance due to unemployment were likely unable to schedule surgery, and could not be accounted for. Third, given the descriptive nature of this study, patient perception on COVID-19 risks, how it influenced their decision to proceed with surgery, or how it has affected their mental health was not collected. Lastly, all procedures were performed at a single community tertiary medical center in Hawai'i, where the ethnic differences are significant and the rates of positive cases remained relatively low compared to other parts of the country and world. Therefore, the results may not be generalizable to other locations.

Conclusion

The cancellation of hip and knee arthroplasties during the COVID-19 pandemic greatly limited patient access to treatment temporarily. While the risks, individual anxieties, or socioeconomic challenges surrounding elective joint arthroplasty may vary from patient to patient, results of this study showed no outstanding disparities in demographic or pre-operative condition of patients choosing to undergo elective joint arthroplasty prior to and throughout the pandemic. Despite the significant interruption in the delivery of care for patients awaiting elective joint arthroplasty, COVID-19 did not appear to have a significant inequitable effect on the different ethnicities evaluated here, nor did it appear to have significantly changed the demographics of patients seeking elective arthroplasty.

Conflict of Interest

None of the authors identify a conflict of interest.

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The Protection Gap - Diagnosis, Treatment Status, and Disease Control for People with Diabetes and Hypertension in the US-Affiliated Pacific Islands

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Abstract

Hypertension and diabetes are major causes of disability and mortality in the US-Affiliated Pacific Islands (USAPI). Control of these conditions has the potential to avert much of the burden of non-communicable diseases in the region. To realize this potential, people living with hypertension and diabetes must be identified and receive treatment of sufficient intensity to control their blood pressure and blood glucose. Data from recent cross-sectional surveys conducted in 5 jurisdictions—Pohnpei, Palau, Kosrae, Marshall Islands and American Samoa—were used to estimate the adult prevalence of hypertension and diabetes as well as diagnosis awareness, treatment, and control status of the adults with these conditions. In addition to traditional prevalence indicators, the authors provide a novel presentation of non-communicable disease (NCD) data, using the concept of “protection gaps”, defined as the number of people living in a community who have an NCD for which effective control is not attained. The protection gap is determined by applying survey-derived population prevalence estimates to the community’s population size using census data. The protection gap is further divided into 3 groups: (1) case-finding gap—those who are unaware of their conditions; (2) tracking and outreach gap—those who are aware of their condition but not receiving treatment; and (3) treatment efficacy gap—those who are receiving treatment but whose disease is not under control. The findings show a large protection gap, with a majority of adults living with hypertension (80.8%) and diabetes (91.6%) not having their condition under control. The case-finding gap accounts for more than half of these, followed by treatment efficacy, and tracking and outreach gaps. These findings can guide public health strategies and monitoring for control of hypertension and diabetes in the USAPI region.

Keywords

Pacific islands, Non-communicable diseases, Secondary prevention, Protection gap, Case-finding gap, Tracking and outreach gap, Treatment efficacy gap

Abbreviations

*CI = confidence interval
NCD = non-communicable diseases
PIHOA = Pacific Islands Health Officers Association
US = United States
USAPI = United States Affiliated Pacific Islands*

Introduction

The US-Affiliated Pacific Islands (USAPI) consist of 1 Polynesian US territory (American Samoa), 2 Micronesian US territories (Guam and the Commonwealth of the Northern Mariana Islands), and 3 Micronesian sovereign states in “Free Association” with the US (the Republic of Palau, the Republic

of the Marshall Islands, and the Federated States of Micronesia comprised of the states of Kosrae, Pohnpei, Chuuk and Yap). Together the USAPI have mounted a concerted response to non-communicable diseases (NCDs) since the Pacific Islands Health Officers Association (PIHOA) issued a regional Declaration of Health Emergency in 2010.¹ The Declaration called for improved surveillance to inform policy and practice in the fight against NCDs. In 2011, PIHOA convened a technical working group to develop an NCD surveillance framework with standardized data collection methods, indicators, and timelines to ensure consistency within and across USAPI jurisdictions. The resulting framework called for monitoring youth and adult NCD risk factors, diabetes and hypertension prevalence, and NCD cause-specific death rates, using school-based surveys, adult community-based surveys, and vital statistics as data sources.² Diabetes and hypertension management can greatly reduce cause-related deaths and morbidity.^{3,4} To achieve these benefits on a population level, a large proportion of people with these conditions must be identified, given appropriate treatment, and maintained on treatment. The term “protection gap” can be used to designate the number of people in a population with diabetes or hypertension whose blood glucose and blood pressure are not kept under control. The protection gap can be further divided into several components. The first is comprised of those with diabetes or hypertension who have never been diagnosed. Since case finding is necessary to identify these, the term “case-finding gap” is used for this component. The second is comprised of those who have been diagnosed but are not in treatment. Since tracking of patients is needed to guide outreach to bring these cases into care, this component is referred to as the “tracking & outreach gap”. The third is comprised of those who are in treatment but whose conditions are still not under control. This component is referred to as the “treatment efficacy gap”. The purpose of this article is to provide data on the prevalence of hypertension and diabetes and determine the size of the protection gap in the adult population in USAPI.

Methods

This is a cross-sectional study using existing data compiled from the NCD hybrid surveys, which are cross-sectional, community-based surveys designed to be conducted every 5 years and to fit with the standardized USAPI NCD surveillance framework.⁵ Study households for the hybrid survey within

each jurisdiction were selected randomly and a single subject age 18 or greater, was selected from each of these households using the Kish methodology, as described by Cash, et al.⁶ Study households were selected separately from main island vs. outer island geographical strata in Pohnpei and the Marshall Islands, while households were selected from single pools in Kosrae and American Samoa, which do not have substantial outer island populations. The surveys included a questionnaire regarding NCD risk factors, physical measurements of height, weight, and blood pressure, as well as measurement of fasting blood sugar, providing estimates of risk factor prevalence, as well as diabetes and hypertension prevalence and disease awareness, management, and control.

Survey sample sizes and dates include Palau (2017, n=1768), the Marshall Islands (2018, n=2869), American Samoa (2018, n=1005), Kosrae (2019, n=604), and Pohnpei (2019, n=1536), for a total of 7782 respondents. Questionnaires were administered using face-to-face interviews by trained surveyors in local language translations. Three blood pressure readings and a fasting blood glucose measurement was collected after the interview. The survey was explained to each participant and voluntary consent was obtained at the time of interview.

Participants were considered to have diabetes or hypertension if they were under current treatment for the condition or if they had elevated fasting blood sugar measurements ($\geq 126\text{mg/dl}$) or blood pressure measurement (average of 3 resting blood pressure readings of $\geq 140\text{mm Hg}$ systolic and/or $\geq 90\text{mm Hg}$ diastolic), respectively. Participants were considered to be aware of their conditions if they answered “yes” to the questions: “Have you ever been told by a doctor, nurse, or other health worker that you have high blood pressure or hypertension?” and “Have you ever been told by a doctor, nurse, or other health worker that you have high blood sugar or diabetes?” Participants were considered to be on treatment for hypertension if they answered “yes” to the question: “Are you currently receiving medicine prescribed by a doctor or other health worker for your high blood pressure or hypertension that you have taken in the past two weeks?” Participants were considered to be on treatment for diabetes if they answered “yes” to either of the following questions: “Are you currently receiving insulin prescribed by a doctor or other health worker for your high blood sugar or diabetes?” or “Are you currently receiving other types of medicine prescribed by a doctor or other health worker for your high blood sugar or diabetes that you have taken in the past two weeks?” Participants with hypertension were considered “under control” if their systolic blood pressure was < 140 and diastolic blood pressure was $< 90\text{mm Hg}$ (3 blood pressure readings are taken for each participant in the NCD Hybrid Surveys, and the average of the 3 is used). Participants who were newly identified with hypertension or diabetes, and those with known disease but not under control were referred to primary care clinics for management.

The prevalence of hypertension and diabetes were reported for adults 18 years and above in each jurisdiction. The prevalence of each condition was further broken down by the following categories: those with each condition who were aware of their diagnosis, those with each condition who were both aware of their diagnosis and in treatment, and those who were both in treatment and under control. Z scores were used to calculate 95% confidence intervals for prevalence estimates, using EpiInfo software, version 7 (Centers for Disease Control and Prevention, Atlanta, GA).

Population disease state estimates were applied to the adult population sizes of each jurisdiction (obtained from the most recent population censuses and using projections for annual changes in population from these censuses⁷⁻⁹). This extrapolation was performed to provide estimates of the numbers of adults in each jurisdiction with hypertension, and with diabetes; compared with the numbers with each condition who were under control. The differences between the numbers with each condition versus the numbers under control are designated here as the hypertension and diabetes “protection gaps”. The protection gap for each condition is further divided into several components. The “case finding gaps” are the estimated numbers living with each condition who are unaware of their condition. The “tracking and outreach gaps” are the estimated numbers who are aware of their conditions but have dropped out of treatment, The “treatment efficacy gaps” are the estimated numbers with each condition who are in treatment but not under control.

Results

Table 1 shows the prevalence of adults with hypertension and diabetes who were aware of their condition, in treatment, and under control. **Figures 1** and **2** show aggregate results. For hypertension, the prevalence across the 5 jurisdictions was 29.3% (95% CI: 28.3-30.3) and jurisdiction-level prevalence of hypertension ranged from 22.5% to 39.8%. Among adults with hypertension, the proportion who were aware of their diagnosis ranged from 35.5% to 66.9%. Between 22.4% and 51.2% were receiving treatment for hypertension and between 10.8% and 25.2% were under control. For diabetes, the aggregated prevalence for the 5 jurisdictions was 27.6% (95% CI: 26.6-28.6) and jurisdiction-level prevalence ranged from 22.2% to 33.6%. Among adults with diabetes, the proportion who were aware of their diagnosis ranged from 29.5% to 46.5%. Between 18.3% and 44.8% were receiving treatment for diabetes, and between 2.8% to 15.1% under control.

The estimated numbers of hypertension or diabetes cases comprising the protection gap and its components are shown in **Table 2** by jurisdiction, and in aggregate in **Figures 1** and **2**. Across all 5 jurisdictions the protection gap (number not in control) is large for both hypertension (n=23 354 of 28 895) and diabetes (n=24 991 of 27 297). All 3 protection gap

Table 1. Prevalence of Hypertension and Diabetes; and Awareness, Treatment, and Control Status Among Adults 18 Years and Older in Selected US-Affiliated Pacific Island Jurisdictions, 2017-2019.^a

Prevalence	Pohnpei	Palau	Kosrae	Marshall Islands	American Samoa
Hypertension					
Hypertension Prevalence, % (CI) ^b	22.5% (20.4-24.6)	33.0% (30.7-35.2)	27.0% (23.5-30.7)	21.0% (19.5-22.6)	39.8% (36.7-43.0)
Aware of Hypertension % (CI)	35.5% (30.4-40.8)	63.4% (59.3-67.4)	66.9% (59.1-74.0)	36.7% (32.8-40.7)	47.4% (42.4-52.5)
Treating Hypertension % (CI)	27.3% (22.7-32.4)	51.2% (47.0-55.4)	44.2% (36.4-52.2)	22.4% (19.1-26.0)	42.8% (37.8-47.9)
Controlled Hypertension % (CI)	15.1% (11.5-19.4)	19.4% (16.1-23.1)	25.2% (18.7-32.5)	10.8% (8.4-13.7)	24.1% (19.8-28.7)
Diabetes					
DM Prevalence, % (CI)	22.8% (20.7-24.9)	22.2% (20.2-24.3)	29.4% (25.7-33.2)	26.8% (25.2-28.5)	33.6% (30.7-36.7)
Aware of Diabetes % (CI)	29.5% (24.8-34.6)	48.5% (43.3-53.7)	41.2% (33.9-48.9)	39.8% (36.2-43.4)	53.4% (47.8-58.9)
Treating Diabetes % (CI)	18.3% (14.4-22.8)	37.5% (32.5-42.6)	29.9% (23.3-37.3)	25.4% (22.4-28.7)	44.8% (39.3-50.4)
Controlled Diabetes % (CI)	3.4% (1.8-5.9)	6.3% (4.0-9.3)	2.8% (0.9-6.5)	3.9% (2.7-5.6)	15.1% (11.3-19.5)

^a As determined by NCD Hybrid Surveys and most recent census numbers for adults 18 years and above.

^b CI= 95% confidence interval

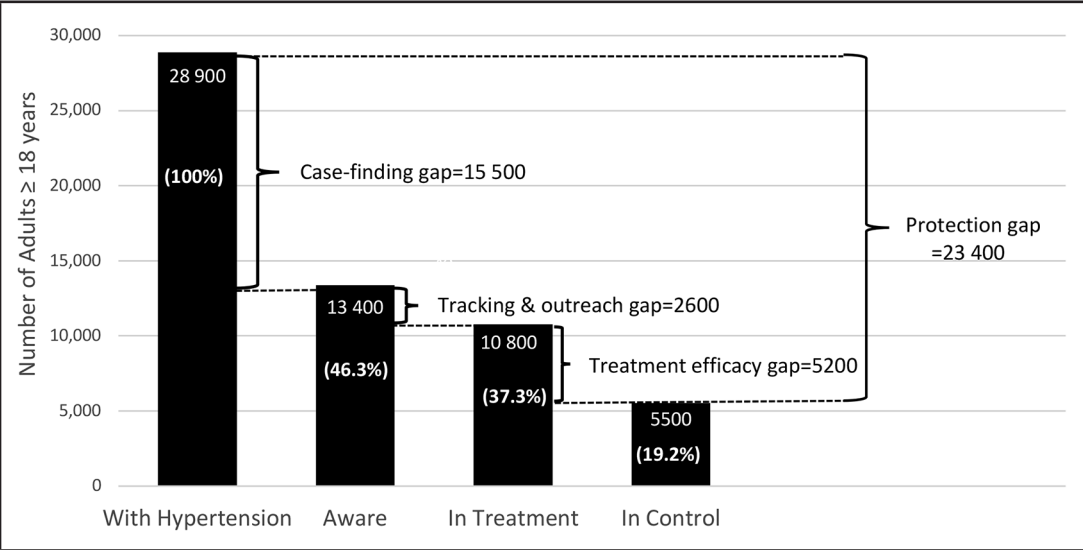


Figure 1. Hypertension- Estimated Aggregate Number (and Percent) of Adults Aware of, Receiving Treatment and In Control, in Selected US-Affiliated Pacific Island jurisdictions, 2017-2019

People with blood pressure of > 140/90 or in treatment for are considered to have hypertension

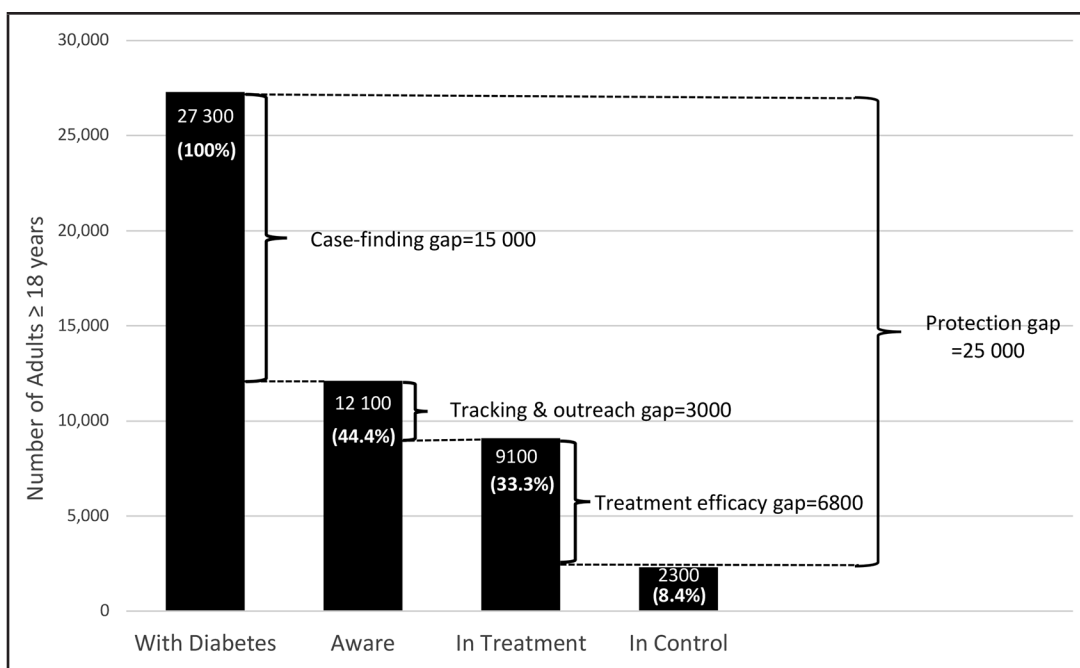


Figure 2. Diabetes- Estimated Aggregate Number (and Percent) of Adults Aware of, Receiving Treatment and In Control, in Selected US-Affiliated Pacific Island jurisdictions, 2017-2019

People with fasting blood sugar ≥ 126 or in treatment are considered to have diabetes

Table 2. Number of Individuals with Hypertension and Diabetes by Protection Gap Components Among Adults $n = 98\,749$ in Selected US-affiliated Pacific Island Jurisdictions, 2017-2019.

Estimated numbers of adults ^a	Pohnpei (2019)	Palau (2017)	Kosrae (2019)	Marshall Islands (2018)	American Samoa (2018)	Total (%)
	N	N	N	N	N	N (%)
Population, adults ≥ 18 years	20 799	13 299	3 713	28 884	32 054	98 749 (100%)
Hypertension						
Estimated # of adults with hypertension	4 700	4 400	1 000	6 100	12 800	29 000 (29.3%)
Case-finding gap ^b	3 000	1 600	300	3 800	6 700	15 400 (53.7%)
Tracking & outreach gap ^c	400	500	200	900	600	2 600 (9.0%)
Treatment efficacy gap ^d	600	1 400	200	700	2 400	5 300 (18.2%)
Aggregated hypertension protection gap ^e	4 000	3 500	800	5 400	9 700	23 400 (80.8%)
Diabetes						
Estimated # of adults with diabetes	4 700	3 000	1 100	7 700	10 800	27 300 (27.6%)
Case-finding gap ^b	3 300	1 500	600	4 700	5 000	15 100 (55.6%)
Tracking & outreach gap ^c	500	300	100	1 100	900	2 900 (11.1%)
Treatment efficacy gap ^d	700	900	300	1 700	3 200	6 800 (24.9%)
Aggregated diabetes protection gap ^e	4 600	2 800	1 100	7 400	9 100	25 000 (91.6%)

^a Estimated number of adults in each category is calculated by multiplying the number of adults 18 years and above according to the most recent census, by the proportion of adults in each category according to the most recent NCD Hybrid Survey results for each jurisdiction (rounded to the nearest hundred)

^b Estimated number of adults with hypertension (or diabetes) who are not aware of their condition

^c Estimated number of adults with hypertension (or diabetes) who are aware of their condition but not on treatment

^d Estimated number of adults with hypertension (or diabetes) who are on treatment but not under control

^e Aggregated hypertension (or diabetes) protection gap = Case finding gap + Tracking & outreach gap + Treatment efficacy gap

components contributed substantially to the protection gap, with the case-finding gap being the largest of the 3 (n = 15 507 for hypertension and n = 15 184 for diabetes), followed by the treatment efficacy gap (n = 5247 for hypertension and 6787 for diabetes), and the tracking and outreach gap (2600 for hypertension and 3020 for diabetes).

Discussion

The protection gap is very large in the surveyed USAPI jurisdictions with substantial contributions from all 3 protection gap components. Most of the protection gap is generated by the many people with diabetes and/or hypertension who are not in care, either because they have never been diagnosed or because they have fallen out of treatment. There are large disparities between the study's jurisdictions and the US national average. The percentage of people with hypertension in the current study who are aware, under treatment, and in control (46.3%, 37.3% and 19.2%, respectively) are much lower than the US national average (82.6%, 75.0% and 51.8%, respectively).^{10,11} The proportion of individuals with diabetes who are diagnosed and under control (44.4% and 8.4%, respectively) is also much lower than US national average (78.5% and 50.0%, respectively; note that the definition of control in the US report is most recent A1C test result < 7.0, and this differs from that used in the present study).¹² Bringing more people who are in treatment for hypertension and diabetes under control in the USAPI would require reaching a large percentage of people under treatment with effective health education, assuring that clinicians are aware of recommended treatment guidelines, overcoming treatment inertia, and, in some jurisdictions, improving the continuity of essential NCD medications and supplies. Although improving the care delivered in clinics is useful, without addressing the problem of the large numbers of patients not in care, the impact at a population level will be very limited. Addressing this gap will require building better systems for systematically identifying people with undiagnosed hypertension and diabetes, for addressing NCD stigma, and for tracking and recalling patients who have dropped out of care. Government sector health agencies provide almost all of the primary care and public health services to the populations of the countries studied, and the populations of these communities are very geographically circumscribed. This is a great advantage for the islands because it presents the opportunity to take a more unified approach to locating and assuring delivery of secondary preventive services for people with conditions such as hypertension and diabetes, than is possible in the fragmented care landscape of the US. The use of the protection gap concept and estimated counts (rather than prevalence percentages) to describe hypertension and diabetes in these communities highlights both the scale and nature of the interventions needed to improve health system performance. To give a hypothetical example, knowing that 28% of adults in a community have diabetes is not as useful for health leaders as knowing that 2200 people have diabetes, because knowing the estimated count allows calculation of number of clinic encounters

that will be needed as well as the number of providers, quantities of medications and supplies, and clinic space needed for their care. Furthermore, it is very useful to know that of these 2200, there are 2010 who are not under control; that 1000 of these don't know they have diabetes (which can be addressed by case finding activities); that there are 500 know they have diabetes but are not engaged in care (which can be addressed by use of tracking registries and outreach); and that there are 510 are in treatment but not in control (which can be addressed by attention to treatment efficacy- clinical guidelines, clinic-based quality improvement and the like). A focus on reducing the number of people in the community in each protection gap component encourages consideration of the needs of non-clinic users in parity with clinic users, encouraging the development of strategies for enhanced case-finding and targeted outreach. Second, once the estimated numbers of patients in each gap component are set forth based on occasional community-based surveys, targets can be set and ongoing monitoring can be done using clinic-based data alone (ie, by setting goals for registry enrollment, clinic attendance and number of cases under control based on jurisdiction-level numbers of people estimated to be in each protection gap component, and estimated numbers in the community with hypertension and diabetes). With very small private medical care sectors and the dominance of government health agencies which deliver both public health and curative services, most jurisdictions in the USAPI are positioned to build systems that integrate case-finding, tracking, and outreach with the clinical care of patients with hypertension and diabetes.

Even if successful at bringing non-diagnosed persons into care, most of the existing NCD clinics have far less capacity than needed to care for the large number who need care. Data such as those presented in **Table 2** can be used to determine optimal staffing for outreach functions and clinics, and for providing medication and supplies budget estimates. Extending treatment to most people with diabetes and hypertension will certainly require increased budgets for medications, supplies, and staffing. Moving care from specialty NCD clinics into general primary care settings and changing the service delivery package and process to favor simpler, less resource intensive styles of NCD care, such as the use of protocols from the World Health Organization's Package of Essential Noncommunicable (PEN) Disease Interventions for Primary Health Care, can limit the extra budget amounts needed to care for many more people and bridge the protection gap.¹³

Limitations of this study include availability of usable survey results from only 5 jurisdictions, limiting the generalizability of findings to all 9 USAPIs. Also, the survey definitions used for diabetes and hypertension categorization and questionnaire data are subject to recall and reporting bias. Study strengths include the use of population data, the standardization of surveys across jurisdictions with rigorous sampling methods, training of enumerators, and quality assurance procedures.

In summary, there is a large protection gap with a corresponding opportunity to greatly decrease the impact of hypertension and diabetes in the USAPI. Taking advantage of this opportunity will require innovations directed toward improving systems for case-finding, tracking and outreach, and intensification of treatment.

Conflict on Interest

None of the authors identify a conflict of interest.

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Hoʻoilina Pono Aʻe: Integrating Native Hawaiian Healing to Create a Just Legacy for the Next Generation

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Abstract

Native healing practitioners have been incorporated into health centers serving large populations of Kānaka ʻŌiwi (Native Hawaiians). However, no studies have examined their impact. A community based participatory research study at Waimānalo Health Center from 2017 to 2019 examined the added value of integrating native healing practices into primary care, including whether there is acceptability of the integration, cultural connectedness due to integration, and empowerment for patients, providers, and staff. Semi-structured interviews were conducted by the research team with 24 patients, providers and staff, and community residents. Through content analysis, 5 themes emerged. The integration of native healing practices provides an alternative to western medicine, recalls ancestral knowledge, focuses on the whole person, generates increased disclosure leading to behavior change, and is central to a decolonizing process. The findings support the integration of native healing practices providing added value in primary care.

Keywords

Native Hawaiian, traditional healing, primary care, culture, health equity

Abbreviations

CAB = community advisory board
WHC = Waimānalo Health Center

Introduction

Indigenous healing practices and traditional healers exist throughout the Pacific Islands.¹ Upon the arrival of Captain James Cook in 1778, Kānaka ʻŌiwi (Native Hawaiians) were described as healthy, fit, and athletic people. In Kānaka ʻŌiwi culture, illness is considered to be derived from *ma ʻi* or imbalance.² Thus, it is the healer's role to find the source of the *ma ʻi* in order to correct it. To Kānaka ʻŌiwi, *ola*, or health/well-being, factors in the harmonious relationship between one's mind, body, and spirit and how these components interact with the world.²⁻³ Concepts such as *ma ʻi* and *ola* are not always congruent with Western medical practices and may impact healthcare utilization. Effective health care for Kānaka ʻŌiwi should consider patient perspectives of health and illness and can benefit from understanding and incorporating Indigenous healing practices into Western medicine.

Prior to the introduction of Western medicine, *lā ʻau lapa ʻau* (plant-based medicine) and *lomilomi* (massage) were used as forms of medicine/healing for Kānaka ʻŌiwi. Both practices involve a spiritual, psychological, and a physical component

to healing. The value of *lōkahi* (harmony) is central to understanding *ola*. It is achieved when physical, mental, and spiritual parts of a person are in balance, including relations with others, family, gods, and the environment.

Today, Kānaka ʻŌiwi healing practices are experiencing a revitalization in contemporary Hawaiʻi despite efforts at colonization evidenced by the outlawing of Kānaka ʻŌiwi religious practices in 1830 and language in 1896.⁴ In 1905, Native Hawaiian healing practices and healers were forbidden by the government of the United States territory of Hawaiʻi with punishments including fines and imprisonment.⁴ Cultural historical trauma has been identified as the psychological, physical, social, and cultural aftermath of colonialism many Indigenous peoples have experienced.⁵ Historical trauma and the negative impact it has on Indigenous communities has been consistently identified as an important cause of health inequities.⁶⁻⁹ Through cultural historical trauma, Kānaka ʻŌiwi have experienced structural and social stressors, including barriers to education, unemployment, and houselessness.¹⁰

Kānaka ʻŌiwi, particularly those living in lower socioeconomic conditions, encounter many barriers to health care including a lack of: insurance, income, housing, childcare, transportation, and time due to school and work responsibilities.¹¹⁻¹² Due to these barriers, some have turned to Kānaka ʻŌiwi healing methods, but may be reluctant to share this with providers due to fear of judgment or discrimination.¹³ Providers may exhibit skepticism due to lack of experience with traditional healing methods or bias to western medicine.¹⁴⁻¹⁵ These types of experiences can lead to alienation, nonadherence, or premature termination of services.^{14,16}

Integration of Traditional Healing Practices

A modest body of research exists on Kānaka ʻŌiwi healing that recommends its integration with Western medicine. A pilot study from an Oʻahu clinic that delivered western and Kānaka ʻŌiwi healing practices (especially *lomilomi*) showed that 76% of patients held the belief that improved health care can best be attained by using Indigenous and Western treatments together, and gave patients agency in choosing the treatment they wanted.¹⁵

In another study, Kānaka ʻŌiwi who received both Western medicine and traditional healing were asked to compare and contrast their views of these different methods.¹⁷ The study

found that *Kānaka ʻŌiwi* saw Western medicine as professional, segmented, and scientific and traditional healing as personal, holistic, and spiritual/cultural. The study recommended that professionals of both healing disciplines collaborate for better health outcomes.

E Ola Mau: The Native Hawaiian Health Needs Study recommends the integration of traditional healing and Western medicine in clinics that serve *Kānaka ʻŌiwi*.¹⁸ The report expands on this recommendation by mentioning different approaches to integration ranging from networking to co-treatment, all working towards the goals of increasing communication between western providers and traditional healers, and improving health care for *Kānaka ʻŌiwi*.

There is growing evidence that culturally relevant interventions can have an impact on diet, blood sugar, blood pressure, cholesterol, and cultural identity.¹⁹⁻²¹ The integration of Western and Indigenous healing has also been studied in other cultures, including First Nations in Canada, Africa, and Asia.^{14, 22-25} Findings from these studies demonstrate that this integration has shown to be effective, needed and preferred among Indigenous patients. However, fewer studies have examined the benefits and challenges of integration among *Kānaka ʻŌiwi* in Hawai ʻi.

Study Objectives

The objective of this study was to further the literature on the integration of Indigenous and Western healing practices in Hawai ʻi among *Kānaka ʻŌiwi*. This study investigated 1 model of integration occurring at Waimānalo Health Center (WHC) on the island of Oʻahu. The objectives were to identify the impact of integrated services on the patient experience, further

understand the process of integrating Indigenous and Western healing (including barriers), and potentially provide information about the critical components of integration for *Kānaka ʻŌiwi*.

To meet these objectives, a 7-member community advisory board (CAB) was formed consisting of patients, staff, and community leaders. The group met monthly for the first 6 months of the study and then quarterly thereafter. Prior to developing the protocols for the study, the authors engaged the CAB in discussions of the potential impact of integrated services to frame the study and guide the work through the research process. From these discussions, a conceptual model for understanding the patient experience emerged. The model posited that first, if the implementation of integrated services is successful, there will be a greater sense of acceptability by both patients and providers. Subsequently, if acceptability is achieved, this will result in a deeper sense of cultural connectedness. In this case, both patients and providers would feel more connected to *Kānaka ʻŌiwi* culture and understand its relevance to wellbeing. The model further hypothesized that if acceptability and cultural connectedness occurs, there will be an increase in patient activation or empowerment among patients and providers (**Figure 1**). These concepts refer to patients being activated to take charge of their own health, and providers observing these behaviors among their patients. And finally, if empowerment is achieved, there is a greater potential for patients to continue to seek services and over time, improve their health status. Based on this conceptual model, the CAB developed a set of interview questions reflecting these stages (**Table 1**). Key informant interviews were used to further validate the CAB's conceptual model and fully understand the patient experience with integration.

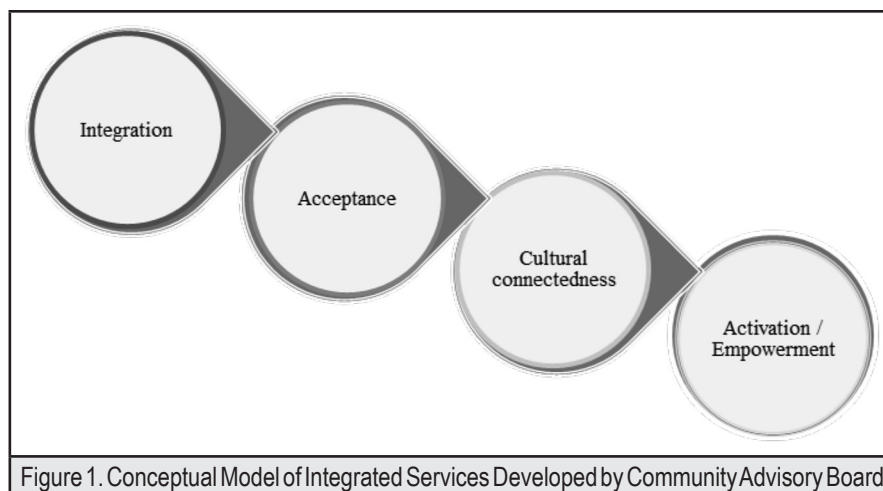


Table 1. Native Hawaiian Healing Interview Questions	
	Question asked of:
Questions reflecting acceptability and cultural connectedness:	
1. Do patients feel more connected to their providers and the clinic?	Patients
2. Do providers, staff, and administration have a greater sense of connectedness to <i>Kānaka ʻŌiwi</i> cultural values and practices?	Providers/Staff
3. Is the clinic viewed as being more connected to the cultural values and practices of the community and <i>Kānaka ʻŌiwi</i> in general?	Community; <i>Kūpuna</i>
Questions reflecting patient empowerment:	
1. Do patients abide by their medical regimens at an increased rate?	Provider/Staff; Patients
2. Do providers promote integrative and team-based approaches to care that include Indigenous healing?	Provider/Staff
3. Does the clinic promote the sustainability of these integrative services?	Patients; Provider/Staff; Community; <i>Kūpuna</i>
4. Do large systems, for example, healthcare systems, insurers, and the government, support the integration of Indigenous healing?	Provider/Staff
5. Is there a diffusion of Indigenous healing practices that is used within the community?	Patients; Community

Table 2. Participant Demographics (N=24)			
Participant Characteristic	Providers/Staff n (%)	Patients n (%)	Community Residents n (%)
Total participants	8 (33)	10 (42)	6 (25)
<i>Kānaka ʻŌiwi</i>	4 (17)	10 (42)	5 (21)
Female	7 (29)	6 (25)	5 (21)
Age range	29-64	45-70	51-71
Years living in Waimānalo	1-15	9-50	20-61
Received <i>lomilomi</i> or <i>lāʻau lapaʻau</i> ^a from WHC	NA	10 (42)	0
Education			
High school only	0	5 (21)	5 (21)
Some college	3 (13)	4 (17)	0
More than 4 years of college	5 (21)	1 (4)	1 (4)
Traditional knowledge	2 (8)	8 (33)	1 (4)

^a Lomilomi, a traditional Native Hawaiian holistic massage. Lāʻau lapaʻau, a traditional Native Hawaiian holistic practice using native plants as medicine.

Methods

Study Design

This exploratory study was approved by the Association of Asian Pacific Community Health Organizations Institutional Review Board (1711-AAPCHO-01N-California-HoailinaPonoAe). A total of 24 adult participants were recruited for the study as described in **Table 2**. Providers and staff were purposely sampled from those who referred patients to or interacted with the *Kānaka ʻŌiwi* healing practitioner and interviewed by a non-WHC researcher. A WHC non-patient care research team member reached out to patients who had a visit with a healing practitioner to determine interest in study participation. Community members were recruited from health promotion classes or events at the health center. *Kūpuna* (honored elders) who were healing practitioners were invited by the research team healing practitioner to be a part of this study.

Three lead researchers, 2 of whom were WHC staff, including the *Kānaka ʻŌiwi* healing practitioner, conducted the interviews. Participants provided informed consent to the researcher prior to the interview. Interviews were about 1 hour long and were audiotaped and transcribed. Demographic participant data was obtained prior to or immediately after the interview. Demographic data for patients and community residents included, race, age, gender, residency, and education. There were several education categories including traditional knowledge, referring to traditional knowledge passed on to the participant from *kūpuna*. Demographic data for staff included, race, age, sex, residency, length of time at WHC, length of time in Hawaiʻi, profession, and education. Each participant received a \$20 grocery gift card for their participation.

Using a directed approach to content analysis, data were initially analyzed deductively using pre-defined, CAB-developed constructs as guidance for initial code categories/themes (ie,

Integration, Acceptability, Cultural Connectedness, Patient Activation/Empowerment). Text was analyzed for the presence of code categories, as well as the meaning and relationship between code categories using the Dedoose software (Dedoose Version 9.0.17, Sociocultural Research Consultants, LLC, Los Angeles, CA, dedoose.com).²⁶⁻²⁷ The generalization and abstraction of data within the code categories were used to formulate our results. For reliability and validity, all interviews were double-coded, by lead researchers and students, and all inconsistencies were discussed and rectified.

The sampling was completed when the analysis reached saturation, in all subgroups, with regard to these themes. The hypotheses were first, participants will be familiar with and will demonstrate acceptance of *Kānaka ‘Ōiwi* healing practices. Second, participants will demonstrate cultural connection through *Kānaka ‘Ōiwi* healing practices. Next, patients will experience a sense of activation and empowerment over their health care needs, including regular clinic attendance, adherence to treatment regimens, improved self-efficacy in their management of acute and chronic illness, and patient satisfaction. Finally, it was hypothesized that through this model of integration, positive changes in patient health outcomes will be observed.

Results

The results are divided by each of the components of the conceptual model. Overall, the evidence supported the model among all study participants and all participants endorsed the role of integration in promoting patient wellbeing. Below, are emerging themes that developed from the interview questions within the components.

Integration

All patients and providers interviewed shared the importance of integrating *Kānaka ‘Ōiwi* healing practices. For the majority of patients, practicing Indigenous healing methods continues the tradition of education and the passing of *‘ike kūpuna* (ancestral knowledge). Participants noted that integration restores Indigenous knowledge and cultural practices to the community. For example, a community resident stated:

“We have the Western medicine, but if you can go into the natural, that’s a lot better, you will need the guidance for it, you cannot just take what you see people saying, ‘oh this herb is good, . . .’ there’s no way of really knowing for sure until you get the education.”

Patients had varying degrees of understanding *Kānaka ‘Ōiwi* healing practices, with some having extensive knowledge and others having mostly memories of family using various plants and healing practices. They recalled seeing these plants growing in their yards as youths. Those with less knowledge reported that having a *Kānaka ‘Ōiwi* healing practitioner gave them access to knowing how to grow and use Indigenous plants. In addition

to patients, providers (n=4) expressed enjoyment in learning alternative forms of care, including *Kānaka ‘Ōiwi* healing practices, and building a more open and trusting relationship with patients through integrated services.

Participants also expressed how integration of *Kānaka ‘Ōiwi* healing practices fills gaps in care that exist when culturally relevant care is not available. Patients expressed satisfaction and trust in the clinic when integration brings culture specific care to patients, as a patient responded:

“I get more than that when I come here, . . . It’s just not take 2 [pills], they really show that they care for me.”

Acceptance

According to the model, integration leads to the second component: acceptance. All patients were open to and even interested in learning more about *Kānaka ‘Ōiwi* healing and saw value in incorporating these healing methods into their health routines. Patients stated they value these methods as they are natural, cost effective, and present fewer side effects compared to western medicine. A patient shared:

“The relief that I get honestly, I no need pain pills. With her [cultural practitioner] treatment, the tension of the pain, the pressure, the depression of the pain, ooh, sore, when she do her number on me, oh, the relief I get! I can live.”

“The practices, I take it home with me and exercise and practice that advice. It’s important that we not only hear advice but do it.”

Among patients, acceptance demonstrates that the benefits of integration are acknowledged which is exemplified by their willingness to utilize, receive, and learn more about *Kānaka ‘Ōiwi* healing methods. Acceptance was widely expressed by patients and providers alike during the interviews. A provider noted:

“With the Native Hawaiian culture being integrated into it, it’s gonna only get better. People want the traditional, they are tired of the iPads and all that kind stuff.”

Interviews with clinic patients and providers revealed not only that acceptance of *Kānaka ‘Ōiwi* healing practices increased through integration, but that acceptance of Western medicine may have also increased. Analysis of interview responses revealed that acceptance of and trust in Western medicine may increase when Western medical providers work in collaboration with already trusted, culturally familiar, *Kānaka ‘Ōiwi* healers. One provider described observing this in patients:

“... folks who not necessarily feel comfortable if we were just providing medicine or providing psychology, they feel really comfortable in talking and they see [the cultural practitioner] and they are almost immediately at ease, and are just more willing to just converse.”

Cultural Connectedness

The integration and acceptance of *Kānaka ʻŌiwi* healing practices into primary care creates an avenue for a deeper connection to Native Hawaiian history, practices, and values as well as brings awareness to the cultural interaction that has influenced the rocky relationship between western medicine and Indigenous peoples. Four sub-categories of cultural connectedness that convey the importance of culture in this community were identified through the interviews: (1) Recollection brings memories to the forefront, generating pride in patients and their family's ancestral knowledge, (2) Revitalization of cultural practices that have been considered sacred wisdom and passed down through generations are legitimized through integration, (3) Respect for cultural values that support a holistic and self-sufficient approach to health, and (4) Culture (Western) to culture (*Kānaka ʻŌiwi*) interaction realizes that patients are caring for their health in the ways they know how and changes the way providers interact with their patients. It breaks barriers to care that *Kānaka ʻŌiwi* have experienced. One provider remarked,

"I think it's also made me aware of the fact that so many patients really do kind of their own *lā'au* that they grew up with at home. So they have some understanding and knowledge of that."

A patient recalled:

"... it [*Kānaka ʻŌiwi* healing services] actually validates what I [learned from *Tūtū Lady*]. For my family, I knew the genealogy of the teachers."

Empowerment

An important aspect of integrating native healing practices for patients is that integration not only helps alleviate the physical, but strengthens the mind and spirit of the patients, giving them sufficient capacity to proactively make positive changes to improve their health. One patient, who is also a parent, reported making dramatic changes in their family diet and encouraged their children to engage in different sports to prevent obesity and chronic illnesses that adversely affected many *kūpuna*. In the interviews, multiple health providers reflected the excitement in seeing the positive changes patients are making to enhance the health status of both themselves and their families:

"I do see greater motivation. I see a lot of families make dramatic changes, they made this poultice, they tried it, and they are so excited... when you see families making these changes, it is so rewarding, and its empowering for the families."

Discussion

In this study, it was hypothesized that through the integration of *Kānaka ʻŌiwi* healing practices, there would be a positive change in the patient, provider and community experience at WHC. It was hypothesized that this would occur through

greater acceptance, increased cultural connectedness, and patient activation and empowerment. Although this study is cross-sectional and thus is not designed to study change over time, patients and providers consistently supported the integration of Native Hawaiian healing practices and positive experiences in acceptance, connectedness, and empowerment because of integration. For example, patients spoke often of wanting to utilize and learn more about Native healing practices.

Acceptance and acceptability of health care is an important component of health care access. Acceptability includes how well patient and provider health beliefs align, the quality and extent of conversation between patient and provider, and how health care systems and services are provided and organized. Increasing the acceptability of health care is crucial in the journey towards health equity.²⁸

Culture's role in the acceptance of health care is corroborated by *Kānaka ʻŌiwi* elders and their family members.²⁹ The current research suggests that when cultural values have a prominent place in the health care of *Kānaka ʻŌiwi*, health care was acceptable to patients. Other research suggests that feelings of cultural connectedness may be important agents of health improvement for indigenous populations. For example, meta-synthesis of research studies working with various Indigenous communities of North America found that cultural continuity was correlated with health outcomes such as a sense of holistic wellness, feelings of belonging, trauma healing, and even lower rates of chronic disease and other illnesses.³⁰

A significant body of health care research exists on the importance of empowerment. Empowerment, in the context of individuals and communities, refers to the realization of self-determination and control over one's circumstances, and the subsequent actions that follow such realizations.³¹⁻³² A study on integrated Western and Aboriginal health care in Canada found that as a result of utilizing traditional healing methods, patients seemed to have a greater sense of empowerment, much like patients in our study implied.²³

Limitations

There are several limitations from this study including the small sample size and self-reports of individual experiences. Next, findings are not generalizable to other integrated primary practices beyond the WHC as the study sampled only patients/providers who had previously been referred or had contact with a *Kānaka ʻŌiwi* healing practitioner. The results may not be generalizable to patients who would decline such a referral, or providers who would decline to make such a referral. In addition, integrating *Kānaka ʻŌiwi* healing into the Western setting of primary care can impact and shorten the amount of time available to deliver traditional healing practices. Having the *Kānaka ʻŌiwi* healing practitioner conduct the *kūpuna* interviews, although culturally appropriate, may be perceived

as biased. Finally, while potentially effective, we acknowledge that native healing practices will not cure all ills. Despite these limitations, the authors believe this study contributes greatly to the literature on the integration of *Kānaka ʻŌiwi* healing into primary care.

Conclusion

There is a need to examine the processes in which *Kānaka ʻŌiwi* healing services are rendered to ensure that the traditions are kept intact. *Kānaka ʻŌiwi* healing is holistic, takes time, and should be just as valued as Western medicine.

Conflicts of Interest

None of the authors identify a conflict of interest.

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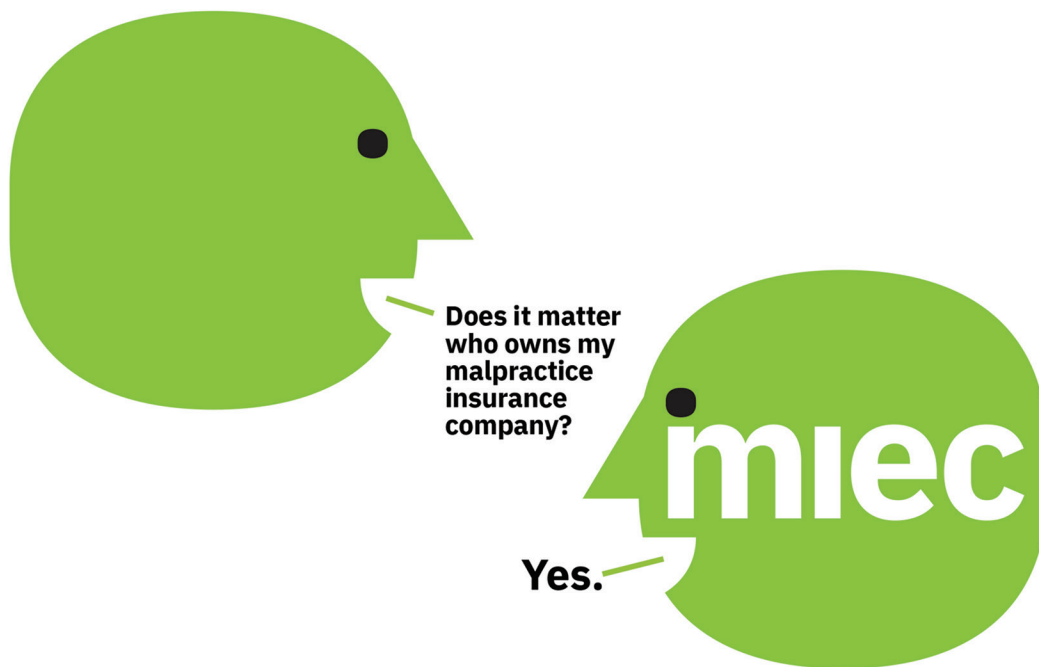
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