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A Community Assessment of Psychological Distress in Pacific Islanders Across San Francisco Bay Area Churches During the COVID-19 Pandemic

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Abstract

Background The COVID-19 pandemic has exacerbated health and social disparities among US Pacific Islanders (PI). Historically, PIs have experienced a high burden of mental illness yet have underutilized mental health services. These already large treatment gaps in mental health care among PIs may worsen during the COVID-19 pandemic. In the face of pre-existing challenges, little is known about the impacts of the COVID-19 pandemic on mental health outcomes among PIs.

Methods A community-based, cross-sectional survey was administered to members of 13 PI churches across the San Francisco Bay Area. We assessed the burden of psychological distress among PIs and its associations with demographic, sociocultural, and health factors.

Key Results Among 439 PI respondents, nearly half reported moderate or severe psychological distress. Only about one-tenth took prescription medication for mental health and less than half utilized a mental health provider in the past year. Most trusted PI churches to provide health and social services. Respondents reporting moderate or severe psychological distress were less likely to utilize a mental health provider in the past year and more likely to feel marginalized, excluded, isolated, or alienated from society “most of the time” or “always.” Psychological distress was also associated with “fair” or “poor” health status, female gender, older adults, low trust in PI churches to provide health and social services, and concern over household finances.

Conclusion Partnerships with faith-based and community-based organizations are essential to address unmet mental health needs and promote support-seeking behaviors among PIs during this ongoing pandemic and beyond.

Keywords COVID-19 · Pacific Islander · Mental health · Racial disparities · Health equity

Introduction

The COVID-19 pandemic has led to significant disruptions linked to mental health and the delivery of mental health care in the USA [1, 2]. Psychological distress and other mood disturbances, including anxiety, depression, and post-traumatic stress disorder, were found to be associated with COVID-19

[1, 3, 4]. Studies suggest that the risk of mood disturbances and maladaptive behaviors may be higher in certain racial and ethnic groups [5, 6]. An analysis of national survey data found that the prevalence of depression, suicidal ideation, and substance use increase/initiation during the pandemic was higher among Hispanic, non-Hispanic Black, and non-Hispanic Other (Native American/Alaska Native, Asian, and multiracial race/ethnicity) populations than non-Hispanic Whites [5]. While existing evidence sheds light on COVID-19-associated racial and ethnic mental health disparities, little is known about the impacts of COVID-19 on mental health outcomes in US Pacific Islanders (PI) [7].

PIs represent a culturally and ethnically diverse population, having origins in the Pacific regions across Polynesia (e.g., Hawaii, Samoa, Tonga), Micronesia (e.g., Guam, Marshall Islands), and Melanesia (e.g., Fiji, Solomon Islands)

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with different histories, languages, and cultural practices [8]. PIs are a historically traumatized and understudied population [9, 10]. Over centuries, PIs have suffered the consequences of western influence, including military colonial rule of their homelands, exposure to nuclear testing and explosions during the Cold War, and disturbances to island infrastructures leading to mass migrations to the USA [8]. Additionally, PIs have often been aggregated with Asian Americans or as Other, which may have overlooked or dismissed their culturally-specific struggles [10]. The cultural and historical trauma faced by PIs has likely contributed to disparities in socioeconomic status, educational attainment, insurance coverage, and health, including mental health [8, 11, 12]. A 2017 study of Polynesians in the USA found that perceived racial discrimination was inversely correlated with self-esteem and satisfaction with life, and positively correlated with anger, depression, anxiety, and stress [13]. In 2019, nearly 17 percent of PI adults suffered a mental illness, but were three times less likely to receive mental health services or prescription medications for mental health as compared to non-Hispanic Whites [11]. Nationally, PI youth had the highest prevalence of heavy episodic drinking and early alcohol use of any racial group between 1991 and 2015 [14].

The burden of COVID-19 illness and death in PIs and its resulting loss, grief, trauma, and disruptions in way of life may further exacerbate mental health disparities in this already vulnerable population [7, 10, 14]. One large-scale investigation of PI adults during the COVID-19 pandemic found that the prevalence of depression, anxiety, and alcohol use disorder were 27%, 19%, and 27%, respectively [7]. In contrast, the prevalence of the US general adult population with a major depressive episode in 2020 was 8.4% [15]. Social stressors associated with the pandemic, such as social isolation, financial strain, unemployment, and fear of illness exposure, may be contributing factors [1, 16]. In a study of PIs in Los Angeles County, participants cited that social isolation from friends and family, which are typical in the PI community, made the pandemic more difficult and worsened their mental health [16]. Individuals with prior or current COVID-19 infection may also be affected by the stigma, outcome, and traumatic memories of the illness [17]. Rising racism and xenophobia facing PIs and Asian Americans during the pandemic may also be contributing to psychological distress [18]. A study assessing COVID-19-related discrimination experiences observed that 10.8% of PI adults reported experiencing discriminatory behaviors [19]. Age, gender, geographic area, and income were found to be associated with individuals' perceptions of discriminatory behaviors during the pandemic. PI adults were also more likely than their White counterparts to report incidents in which people acted afraid of them because of suspected COVID-19 infection. The pandemic has additionally exacerbated gaps in mental health care, resulting in limited access

to mental health services, unintegrated systems, and lack of psychiatric beds [1, 2]. Altogether, these issues may worsen mental health care seeking behavior among PIs, which was already shown to be low pre-pandemic despite high mental health burden in this population [9, 12].

Mental health experiences, needs, and attitudes among PIs during the COVID-19 pandemic are not clear given the paucity of research on this topic. Therefore, we conducted a community-based study to examine the burden of psychological distress and its associations with demographic, socio-cultural, and health factors among PIs across San Francisco Bay Area churches during the COVID-19 pandemic.

Methods

Data Collection

A community-based, cross-sectional survey was administered to members of 13 PI churches across the San Francisco Bay Area, including 5 Samoan, 5 Tongan, and 3 Fijian churches. These 13 ministries, predominantly located in San Mateo County (7/13; 54%) and Sonoma County (4/13; 31%), were selected because of their key roles in providing PI church members and surrounding communities with COVID-19 vaccinations, testing, health information, and food drives throughout the pandemic. This survey was part of a quality improvement, community-led initiative called Pacific Islanders Together Towards Health, which aimed to improve the delivery of health care for PIs during the COVID-19 pandemic. University of California, Berkeley researchers, in collaboration with PI community leaders, developed a 28-item survey that assessed PIs' demographic characteristics, PI faith-based service utilization, cultural health, mental health, COVID-19 testing, vaccination, and perceptions (Appendix 1). Survey respondents were identified using convenience sampling at church services and snowball sampling at church leaders' discretion. Participation was voluntary with a \$25 gift card given as an incentive for completing the survey. This survey was conducted electronically via Qualtrics and in-person on paper from October to November 2021. Among 487 collected surveys, 1 was excluded due to missing age and 47 were excluded as respondents were less than 18 years old. A total of 439 PI adult surveys were used for this analysis. The University of California, Berkeley Institutional Review Board determined that this project did not constitute human subjects research as defined under 21 CFR 50.3 and 45 CFR 36.102.

Data Variables

Psychological distress was assessed using the Kessler Psychological Distress Scale (K6) [20]. K6 is a self-reported

measure of how frequently respondents experience symptoms of psychological distress (e.g., nervous, hopeless, depressed) during the past 30 days on a 5-point Likert scale. Using a validated cut-off criterion [20], respondents were categorized into “none/little” ($K6 < 5$), “moderate” ($5 \leq K6 < 13$), and “severe” ($K6 \geq 13$) psychological distress. The Cronbach’s alpha coefficient for the K6 measure was 0.90.

Among the survey items, 15 were selected based on their relevance to this K6 measure to assess whether psychological distress influenced these factors among PIs. These items were also used in our analysis as prior studies have found associations between psychological distress and demographic factors, such as gender and age [21], insurance attainment [22], and cultural factors, including familial support, stigmatizing attitudes, or acculturative stress [23]. These covariates fell under four categories: demographic characteristics (age, sex, ethnicity, health status, health insurance), cultural health (trust in PI church to provide health and social services, cultural protective factors, and cultural risk factors), mental health (concern over household finances, mental health insurance attainment, mental health prescription utilization in the past year, and mental health provider utilization in the past year), and COVID-19 (positive test within 14 days, vaccination with at least one dose, concern about vaccine side effects, and concern about vaccine safety). Age was collected as numeric data but categorized into “young adult” (ages 18 to 30), “adult” (ages 31 to 50), or “older adult” (ages 51 and older). Nominal data included sex, ethnicity, health insurance, mental health insurance attainment, mental health prescription utilization, mental health provider utilization, COVID-19 positive test within 14 days, and COVID-19 vaccination. Measures assessing perception of cultural protection and cultural risk were derived from the Psychology Applied Research Center at Loyola Marymount University [24] and assessed on a 5-point Likert scale ranging from “never” to “always.” Cultural protective factors represent acceptance of personal culture (feeling “connected to your culture”) and holistic wellness (feeling “balanced in mind, body, spirit, and soul”). Cultural risk factors represent acceptance of societal culture (“marginalized or excluded from society”) and “isolated and excluded from society”). The remainder of these covariates were also measured in a 5-point Likert scale—trust in PI church to provide health and social services (“not at all” to “completely”), concern over household finances (“not concerned at all” to “extremely concerned”), concern about vaccine side effects or safety (“not at all concerned” to “extremely concerned”).

Data Analysis

Associations between psychological distress and these covariates were initially examined using the Kruskal–Wallis

one-way ANOVA test (Table 1). Statistical significance was observed for p -values less than 0.05. Covariates with a p -value less than 0.1 in the Kruskal–Wallis ANOVA test were then included in a multinomial logistic regression analysis (Table 2). Using this model, the adjusted relative risk ratio (RRR) of psychological distress in PIs across the ten selected covariates were computed. All analyses were conducted using R Software 4.2.3 (R Foundation for Statistical Computing; Vienna, AUT).

For our analysis, we transformed Likert scale covariates into binary variables. The items, feeling “...connected to your culture” and “...balanced in mind, body, spirit, and soul,” as well as “...marginalized or excluded from society” and “...isolated and alienated from society,” were combined into binary cultural protective factors and cultural risk factors measures, respectively, where scores greater than 6 were categorized as “Most of the Time/Always” and scores less than or equal to 6 were categorized as “Never/Rarely/Sometimes.” The Cronbach’s alpha coefficient for cultural protective factor and cultural risk factor measures were 0.75 and 0.90, respectively. Additionally, responses to other covariates that were based on a 5-point Likert scale (health status, trust in PI church to provide health and social services, concern over household finances, concern about vaccine side effects, and concern about vaccine safety) were grouped into two categories, comprising of the first three points (e.g., “not at all/a little bit/somewhat”) and last two points (e.g., “very much/completely”).

Results

Overall Respondent Characteristics

Of 439 PI respondents, most were young adults ($n = 226$; 51.5%) and female ($n = 281$; 64.3%) (Table 1). The mean age of respondents was 47 years (range 18–93). Tongans ($n = 159$; 36.2%), Samoans ($n = 150$; 34.2%), and Fijians ($n = 106$; 24.1%) constituted the primary respondent groups by PI ethnicity. More than eighty percent of respondents reported having “good,” “very good,” or “excellent” health ($n = 357$; 81.9%) and health insurance coverage ($n = 346$; 82.0%). Among those with health insurance, most had insurance that covered mental health treatment ($n = 231$; 84.9%).

Nearly half of respondents reported moderate ($n = 154$; 37.6%) or severe ($n = 37$; 9.0%) psychological distress. Similarly, less than half of respondents reported seeing a mental health provider in the past year ($n = 170$; 40.4%). Only about one-tenth reported taking prescription medication for mental health in the past year ($n = 49$; 11.8%). While most reported cultural protective factors (i.e., felt “balanced in mind, body, spirit, and soul” or “connected to their culture”) “most of the time” or “always” ($n = 292$; 69.4%), about a

Table 1 Psychological distress among Pacific Islander respondents, *n* (%), stratified by demographic characteristics (*N* = 439)^a

Characteristic	Total	None/little	Moderate	Severe	<i>p</i> -value
Overall	439	219 (53.4)	154 (37.6)	37 (9.0)	
Age					
Young adult (18–30)	226 (51.5)	121 (59.9)	67 (33.2)	14 (6.9)	0.01
Adult (31–50)	126 (28.7)	53 (43.1)	57 (46.3)	13 (10.6)	
Older adult (51 +)	87 (19.8)	45 (52.9)	30 (35.3)	10 (11.8)	
Sex					
Male	156 (35.7)	91 (60.3)	47 (31.1)	13 (8.6)	0.06
Female	281 (64.3)	128 (49.8)	105 (40.9)	24 (9.3)	
Ethnicity					
Samoan	150 (34.2)	59 (41.3)	68 (47.6)	16 (11.2)	< 0.01^b
Tongan	159 (36.2)	75 (50.3)	60 (40.3)	14 (9.4)	
Fijian	106 (24.1)	76 (80.0)	13 (13.7)	6 (6.3)	
Mixed PI	24 (5.5)	9 (39.1)	13 (56.5)	1 (4.3)	
Health status					
Good/very good/excellent	357 (81.9)	196 (58.3)	117 (34.8)	23 (6.8)	< 0.01
Fair/poor	79 (18.1)	23 (31.9)	35 (48.6)	14 (19.4)	
Health insurance					
Yes	346 (82.0)	171 (52.3)	127 (38.8)	29 (8.9)	0.34
No	76 (18.0)	41 (60.3)	20 (29.4)	7 (10.3)	
Trust in PI church to provide health and social services					
Not at all/a little bit/somewhat	98 (22.7)	37 (43.0)	41 (47.7)	8 (9.3)	0.04
Very much/completely	334 (77.3)	181 (56.6)	112 (35.0)	27 (8.4)	
Cultural protective factor in the past 30 days					
Never/rarely/sometimes	129 (30.6)	83 (66.4)	36 (28.8)	6 (4.8)	< 0.01
Most of the time/always	292 (69.4)	134 (47.9)	115 (41.1)	31 (11.1)	
Cultural risk factor in the past 30 days					
Never/rarely/sometimes	337 (78.4)	207 (63.9)	102 (31.5)	15 (4.6)	< 0.01
Most of the time/always	93 (21.6)	11 (12.9)	52 (61.2)	22 (25.9)	
Concern over household finances					
Not at all/a little/somewhat concerned	284 (65.9)	153 (70.2)	100 (65.4)	15 (42.9)	0.01
Very/extremely concerned	147 (34.1)	65 (29.8)	53 (34.6)	20 (57.1)	
Insurance covers mental health treatment ^c					
Yes	231 (84.9)	115 (51.6)	88 (39.5)	20 (9.0)	0.90
No	41 (15.1)	17 (48.6)	16 (45.7)	2 (5.7)	
Took prescription medication for mental health in past year					
Yes	49 (11.8)	27 (58.7)	13 (28.3)	6 (13.0)	0.66
No	367 (88.2)	182 (52.6)	133 (38.4)	31 (9.0)	
Utilized a provider for mental health in the past year					
Yes	170 (40.4)	73 (47.4)	60 (39.0)	21 (13.6)	0.03
No	251 (59.6)	137 (56.8)	88 (36.5)	16 (6.6)	
Tested positive for COVID-19 in the past 14 days ^d					
Yes	30 (25.6)	26 (92.9)	1 (3.6)	1 (3.6)	< 0.01
No	87 (74.4)	35 (42.7)	37 (45.1)	10 (10)	
Vaccinated (at least one dose)					
Yes	364 (83.5)	184 (54.4)	123 (36.4)	31 (9.2)	0.45
No	72 (16.5)	34 (48.6)	30 (42.9)	6 (8.6)	
Concern about vaccine side effects					
Not at all/slightly/moderately concerned	290 (66.5)	149 (68.3)	100 (65.4)	22 (59.5)	0.54
Very/extremely concerned	146 (33.5)	69 (31.7)	53 (34.6)	15 (40.5)	

Table 1 (continued)

Characteristic	Total	None/little	Moderate	Severe	p-value
Concern about vaccine safety					
Not at all/slightly/moderately concerned	286 (66.7)	148 (68.8)	99 (65.6)	21 (58.3)	0.44
Very/extremely concerned	143 (33.3)	67 (31.2)	52 (34.4)	15 (41.7)	

Bolded values indicate statistical significance

RRR relative risk ratio, CI confidence interval, Ref reference category

^aDenominator used to calculate proportions (%) was total response count for each respective category. Proportions may not account for nonresponse

^bDue to a small sample size, this p-value may represent an imprecise estimate

^cRepresents 272 of 342 respondents who reported having health insurance

^dRepresents 117 of 433 respondents who reported testing for COVID-19 in the past 14 days

Table 2 Logistic regression showing associations between psychological distress among Pacific Islander respondents and selected covariates (N = 439)^{a,b}

Characteristic	Moderate		Severe	
	OR	95% CI	OR	95% CI
Age				
Young adult (18–30)	Ref	—	Ref	—
Adult (31–50)	2.16	(1.05, 4.45)	0.89	(0.25, 3.12)
Older adult (51 +)	1.01	(0.51, 1.99)	0.33	(0.10, 1.10)
Sex				
Male	Ref	—	Ref	—
Female	2.16	(1.28, 3.64)	2.23	(0.87, 5.70)
Ethnicity ^c				
Tongan	Ref	—	Ref	—
Samoan	1.93	(1.09, 3.40)	1.68	(0.62, 4.54)
Fijian	0.15	(0.07, 0.34)	0.35	(0.09, 1.37)
Mixed PI	1.80	(0.63, 5.09)	0.71	(0.09, 8.71)
Health status				
Good/very good/excellent	Ref	—	Ref	—
Fair/poor	1.97	(1.00, 3.90)	4.35	(1.52, 12.44)
Trust in PI church to provide health and social services				
Not at all/a little bit/somewhat	2.75	(1.47, 5.13)	2.37	(0.77, 7.24)
Very much/completely	Ref	—	Ref	—
Cultural protective factors in the past 30 days				
Never/rarely/sometimes	1.10	(0.96, 2.84)	0.30	(0.11, 0.80)
Most of the time/always	Ref	—	Ref	—
Cultural risk factors in the past 30 days				
Never/rarely/sometimes	Ref	—	Ref	—
Most of the time/always	9.07	(1.98, 41.83)	52.11	(10.26, 264.71)
Concern over household finances				
Not at all/a little concerned/somewhat	Ref	—	Ref	—
Very/extremely concerned	1.65	(0.96, 2.84)	4.80	(1.92, 12.03)
Utilized a provider for mental health in the past year				
Yes	Ref	—	Ref	—
No	0.52	(0.31, 0.88)	0.33	(0.14, 0.80)

Bolded values indicate statistical significance

RRR relative risk ratio, CI confidence interval, Ref reference category

^aCovariates (e.g., age, ethnicity) with a p-value < 0.1 in the Kruskal–Wallis one-way ANOVA test were included in this logistic regression analysis. RRRs were adjusted for all ten covariates

^b“None/Little” psychological distress was the reference category for this model

^cDue to a small sample size, confidence interval may have a larger margin of error

quarter reported cultural risk factors (i.e., “marginalized or excluded from society” or “isolated and alienated from society”) “most of the time” or “always” ($n = 93$; 21.6%). Most trusted PI churches “very much” or “completely” to provide health and social services ($n = 334$; 77.3%). Among 117 of 433 respondents (27.0%) who tested for COVID-19 infection within 14 days, about a quarter reported testing positive ($n = 30$; 25.6%). Though most received at least one dose of a COVID-19 vaccine ($n = 364$; 83.5%), more than thirty percent of respondents were more than “moderately” concerned about vaccine side effects ($n = 146$; 33.5%) and safety ($n = 143$; 33.3%).

Factors Associated with Psychological Distress

In our initial ANOVA analysis (Table 1), psychological distress among PIs was associated with age ($p = 0.01$), ethnicity ($p < 0.01$), health status ($p < 0.01$), trust in PI church to provide health and social services ($p = 0.04$), cultural protective factors ($p < 0.01$), cultural risk factors ($p < 0.01$), concern over household finances ($p = 0.01$), mental health provider utilization ($p = 0.03$), and COVID-19 positive test within 14 days.

After controlling for all covariates (Table 2), risk of severe psychological distress compared to none/little psychological distress was significantly lower in older adults 51 years or older than young adults between 18 and 30 years (RRR 0.33; 95% CI 0.10–1.10). Respondents with moderate psychological distress were more likely to be female than male (2.16; 1.28–3.64) and less likely to be Fijians than Tongans (0.15; 0.07, 0.34) compared to those with none/little psychological distress. Risk of severe psychological distress was four times greater in those who reported “fair” or “poor” health status than their counterparts (4.35; 1.52–12.44). Respondents reporting moderate psychological distress were about three times more likely to feel “not at all,” “a little bit,” or “somewhat” trust in PI churches to provide health and social services compared to those reporting none/little psychological distress (2.75; 1.47–5.13). Respondents with severe psychological distress were less likely to “never,” “rarely,” or “sometimes” feel “balanced in mind, body, spirit, and soul” or “connected to their culture” in the past 30 days (0.30; 0.11–0.80) compared to those reporting none/little psychological distress. Risk of moderate and severe psychological distress were nine times (9.07; 1.98–41.83) and fifty times (52.11; 10.26–264.71) greater, respectively, among those who felt “marginalized or excluded from society” or “isolated and alienated from society” in the past 30 days “most of the time” or “always.” Respondents reporting moderate (0.52; 0.31–0.88) or severe (0.33; 0.14–0.80) psychological distress were less likely to utilize a mental health provider in the past year. Additionally, respondents reporting severe psychological distress were nearly five times more

likely to be “very” or “extremely concerned” over household finances compared to their counterparts (4.80; 1.92–12.03).

Discussion

This cross-sectional study is the first to characterize self-reported psychological distress among PIs from faith-based organizations in a major metropolitan area during the COVID-19 pandemic. Few studies documented experiences and impacts of the COVID-19 pandemic among PIs [10, 25, 26] and to a lesser extent, related to mental health [7]. One study investigated alcohol, tobacco, and other drug use, mental health, and treatment needs among PIs in five populous US states during the COVID-19 pandemic [7], while another assessed mental health impacts of COVID-19 on PIs in Los Angeles County using a qualitative approach [16]. Current research suggests that PIs bear a high burden of mental illness, including depression, anxiety, and alcohol use disorder, pre- and post-pandemic [7, 16]. Mental health issues among PIs may be further exacerbated by COVID-19 and its effects on their health, finances, jobs, housing, and social gatherings [7, 16]. Our work uniquely partnered with 13 PI churches across the San Francisco Bay Area to identify unmet mental health needs among PIs during the COVID-19 pandemic.

In our study, nearly half of PI respondents reported moderate or severe psychological distress. Though most had insurance for mental health treatment, only about one-tenth took prescription medication for mental health in the past year and less than half saw a mental health provider in the past year. Respondents with moderate or severe psychological distress were also less likely to utilize a mental health provider in the past year compared to those reporting none/little psychological distress. A 2012 study of non-institutionalized adults in California, including Hispanic, Asian American, African American, Caucasian, and Other, found that respondents with moderate and severe psychological distress (as defined by the K6 criterion) had greater number of visits with a professional for mental/emotional health or use of alcohol/drugs [20]. The likelihood that a doctor provided or arranged treatment for one’s emotions or moods was greater among respondents with severe psychological distress compared to those with moderate psychological distress. However, our findings showed that among PIs, there was low treatment-seeking behavior despite burden of high psychological distress [9, 12, 27].

Reasons for this discrepancy may include limited access to mental health care in the face of growing demands for mental health services and scarcity of mental health providers during the COVID-19 pandemic [1]. Additionally, PIs represent a culturally diverse population of more than 20 ethnic groups, so there may be differences in experiences,

beliefs, and attitudes about mental health that affect their inclination to seek care. Our study is the first to assess differences in psychological distress among specific PI ethnic groups, including Fijians, Samoans, Tongans, and Mixed PI. In our study, respondents with moderate psychological distress were less likely to be Fijians compared to Tongans. Our finding may allude to possible intersections between culture and mental health, stressing the need to further explore ethnic-specific differences in psychological distress.

Moreover, PIs may not be comfortable seeing mental health providers who may not understand their culture and perceptions of mental health. This issue may be mediated by mental health resources and social support provided by faith-based organizations in these respective PI communities. According to a meta-analysis, individuals showed strong preferences for a therapist of their own race and ethnicity [28]. However, PIs comprise of only 0.1% of the physician workforce regardless of specialty [29] and only 0.03% of psychologists in the USA [30]. Mental illness stigma may also interfere with utilization of care, as certain attitudes and beliefs about mental health among PIs may deter them from seeking help [9]. A survey-based study found that compared to the US public, PIs reported greater stigma towards mental illness that influence help-seeking behavior [9]. PIs were more likely to view mental illness, such as depression and schizophrenia, as caused by socio-moral rather than neurobiological factors, not serious, more likely to improve on its own and less likely with treatment, and dangerous to others. Attributing mental disorders to a person's bad character was also associated with greater social distance, while attributing mental disorders to "God's will or life's ups and downs" predicted lower social distance among PIs. In another study, one PI participant stated that mental illness was perceived as a sign of "weakness," noting that this made it difficult for people to seek mental health support [16].

Our findings shed light on factors associated with psychological distress among PIs during the COVID-19 pandemic, which may represent potential targets for public health intervention, advocacy, and research. Prior studies suggest that COVID-19 is implicated in the development and severity of neuropsychiatric symptoms, including depression, anxiety, post-traumatic stress disorder, and long COVID syndrome [17]. Prior reports of social isolation, anxiety, stress, and boredom among PIs further highlight the impacts of the pandemic on their mental health [16]. Additionally, in our study, about a quarter of PI respondents reported testing positive among those who tested for COVID-19 infection within 14 days. More than eighty percent received at least one dose of the COVID-19 vaccine, but about a third were concerned about vaccine side effects and safety. Considering existing evidence as above, a history of COVID-19 infection, COVID-19 vaccination status, or concern about COVID-19

vaccine side effects and safety may affect psychological distress in PIs. Based on our findings, however, whether these associations exist are unclear. While the Kruskal Wallis one-way ANOVA test showed significant association between psychological distress and history of COVID-19 positive infection in the past 14 days, our logistic regression analysis did not. Future studies may be needed to elucidate these findings.

Our study also found that most PI respondents reported cultural protective factors (feeling "connected to your culture" and "balanced in mind, body, spirit, and soul") and trusted PI churches to provide health and social services. Respondents with moderate psychological distress were more likely to perceive low trust in PI churches to provide health and social services compared to those reporting none/little psychological distress. Risk of moderate and severe psychological distress were also significantly greater among those who felt "marginalized or excluded from society" or "isolated and alienated from society" in the past 30 days compared to reporting none/little psychological distress. This finding is consistent with a 2017 study on Polynesians in the USA, which found that racial discrimination was a prevalent factor in their well-being and positively associated with four indicators of psychological distress, including anger, depression, anxiety, and stress [13]. However, the risk of severe psychological distress was lower among those feeling "never," "rarely," or "sometimes" "balanced in mind, body, spirit, and soul" or "connected to their culture" in the past 30 days compared to their counterparts. Our study reinforces the importance of recognizing the relationship between mental health and racial discrimination when caring for PI communities. Our results also highlight the importance of having a strong social network for PIs, a source of support for this population that was likely compromised by the pandemic [16]. Our findings suggest that faith-based and community-based organizations may be integral to educating, promoting, and providing mental health care for PIs.

Our study also provides insight into the relationship between other factors, such as health status and finances, and mental illness among PIs. Risk of severe psychological distress was four times greater in those who reported "fair" or "poor" health status than their counterparts. Respondents with severe psychological distress were nearly five times more likely to be "very" or "extremely concerned" over household finances. PIs' mental health are likely exacerbated by gaps in social determinants, including poverty, insurance coverage, and educational attainment. In addition to social disparities, PIs are disproportionately affected by diabetes, obesity, heart disease, stroke, chronic liver disease, and cancer than non-Hispanic Whites [11]. Our study highlights the importance of increasing public health efforts to address health and social disparities and improve quality of life among PIs.

Given its cross-sectional design, this study is unable to establish causality as to whether COVID-19 directly impacts psychological distress among PIs. Another limitation is that our study population comprised of only PIs; therefore, we were unable to make comparisons in psychological distress between PIs and other racial and ethnic groups. This study also represents one community of Pacific Islanders from the San Francisco Bay Area, and thus, its findings may not generalize to the wider PI population. Additionally, the K6 scale may be used as a screening tool for the broad presence of mental illness but may not be used to identify specific psychiatric diagnoses, such as depression or anxiety, as defined by the Diagnostic and Statistical Manual of Disorders (DSM). For Likert-type items, categories were collapsed to binary variables to maximize response counts for multinomial analyses; thereby, this study was less able to elucidate the degree of favorability towards a certain response. Based on our study limitations, larger population-based studies of PIs, disaggregated by ethnicity, in comparison with other racial and ethnic groups, should be conducted to assess mental illness burden in PIs and its contributing factors during the COVID-19 pandemic. Further studies, such as qualitative research, could also explore barriers to and reasons for underutilization of mental health care among PIs, such as language, costs of care, transportation, and chronic illness.

Our findings illustrate the importance of our medical community, governmental agencies, and policymakers to partner with faith-based and community-based organizations to address unmet mental health needs in PI communities. Mental health promotion by trusted organizations can help to reduce mental illness stigma, promote mental health care seeking behavior, and increase access to mental health services among PIs. As evidenced by our study, PIs place trust in community entities, such as churches, to provide health and social services. Often at the frontlines of COVID-19 testing, vaccination, and health information distribution, churches serve an integral role as a cultural liaison between PIs and external stakeholders. Churches may also offer a safe space for PIs to engage in social gatherings, establish strong social networks, and provide recommendations for ways to improve their health and well-being. Additionally, nonprofit mental health organizations such as Richmond Area Multi-Services, Inc., collaborate with long-standing PI organizations such as the Samoan Community Development Center, Regional Pacific Islander Taskforce, and Taulama for Tongans to provide culturally specific mental health prevention and early intervention workshops. An example includes the Pacific Islander Wellness Initiative (PIWI) that provides free prevention and early intervention counseling services, culturally and linguistically appropriate psychoeducation, support groups, and other mental health promotion activities for PIs in the Alameda County. In San Francisco County, the Samoan Wellness Initiative, offered

by the Samoan Community Development Center, provides similar services as PIWI. Collectively, these efforts, along with future research, are imperative to foster sociocultural protective factors and support-seeking behaviors among PIs and promote their overall health and well-being during this ongoing pandemic and beyond.

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Data Availability Data elements will be available upon direct request to the corresponding author.

Declarations

Ethics Approval The University of California, Berkeley Institutional Review Board determined that this project did not constitute human subjects research as defined under 21 CFR 50.3 and 45 CFR 36.102.

Consent for Participation/Publication As our study was determined to not constitute human subjects research by the University of California, Berkeley Institutional Review Board, informed consent for participation and publication was not required.

Competing Interests The authors declare no competing interests.

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