Risk and Protective Factors for Mental Health among American Indian, Alaska Native, and Native Hawaiian Older Adults in the United States

Collette Adamsen, PhD, Miquela Ibrao, PhD, Yeonjung Jane Lee, PhD, Shelly Davis, MPA, MPH, Britteny M. Howell, PhD, CPG, CDP, Vanessa Y. Hiratsuka, PhD, Jordan P. Lewis, PhD, Yan Yan Wu, PhD, and Kathryn L. Braun, DrPH

Abstract: *Despite histories of loss and discrimination, more American Indian, Alaska Native, and Native Hawaiian (AI/AN/NH) people are living into old age. Risk and protective factors for AI/AN/NH Elder mental health are poorly described. Data from the 2017-2020 Identifying Our Needs (ION): A Survey of Elders needs assessment of 19,143 AI/AN/NH Elders receiving nutrition, socialization, and caregiver-assistance services through Title VI of the Older Americans Act were analyzed. We hypothesized that (1) family, cultural, and social engagement are protective factors, (2) limitations in activities of daily living (ADL) and instrumental activities of daily living (IADL) are risk factors for mental health status, and (3) status of grandparent caregiver is associated with lower mental health scores. As hypothesized, frequent engagement in traditional cultural activities was protective for mental health status. ADL/IADL limitations were the largest risk factor for poor mental health among AI/AN/NH Elders, while engagement in social activity was the strongest protective factor. Additionally, the status of a grandparent as a primary caregiver for their grandchildren was associated with poorer mental health. Indigenous-serving programs need expanded funding to support both cultural and personal/family services to the growing population of AI/AN/NH Elders in the United States.*

INTRODUCTION

Mental health is a priority set forth by the U.S. Surgeon General's Office (Surgeon General's Office, 2024). The older adult (65+ years) group is the fastest growing population demographic in the United States (US Census Bureau, 2024), but older adults are markedly absent from the priority populations for mental health protection. This may be, in part, because limited previous research suggests that fewer older adults experience depression compared to younger adults, which recognizes the role of survivorship and resilience in aging (Blazer, 2000, 2003; Gerlach et al., 2022). Approximately 5-10% of the general population of community-living adults aged 65 and older in the United States have depression, and major risk factors for depression include chronic disease, disability, and lack of social support (Blazer, 2003; Cheruvu & Chiyaka, 2019; Kiyoshige et al., 2019; Na & Streim, 2017). Despite these seemingly low rates of mental health disorders among the general older adult population, more research is needed to support older adults who do experience adverse mental health effects. Importantly, American Indian, Alaska Native, and Native Hawaiian (AI/AN/NH) populations experience unique mental health challenges rooted in the history of trauma, yet are unlikely to seek proper help (National Alliance on Mental Illness, 2024).

AI/AN/NH Elders have the unique experience of living through U.S. policies focused on termination of AI/AN/NH Tribal governance systems and the forceable assimilation of AI/AN/NH peoples into the general population (Wilkins & Stark, 2017). These policies resulted in loss of culture, land, and traditions, which was determinantal to AI/AN/NH ways of life and to the mental health of AI/AN/NH peoples (Brave Heart, 1995; Sotero, 2006; Walters et al., 2011). Currently, about 9.7 million AI/ANs and about 560,000 NHs are estimated to live in the United States, together comprising less than 3% of the U.S. population (Chavez & Kaur, 2021). As of 2020, over 300,000 of these AI/AN/NH peoples were aged 65 or over and these numbers are expected to increase to over 640,000 by 2060 (Administration on Community Living, 2021).

On the whole, life expectancy is 5.5 years shorter for the AI/AN population and 2.9 years shorter for the NH population than the national average, although this varies by Tribe and state (Indian Health Service, 2019; Wu et al., 2017). Lower life expectancies experienced by AI/AN/NH populations are the result of structural inequities directly and indirectly related to colonization and

earlier onset of chronic disease experienced by these groups (Jaramillo et al., 2022; de Leeuw et al., 2015). Nevertheless, more AI/AN/NH people are living into old age, making this group increasingly interested in gerontologists (Braun et al., 2014; Jervis, 2010).

Although there is growing awareness of the impact of historical trauma on the physical and mental health of Indigenous Peoples worldwide (Brave Heart, 1995; Hiratsuka et al., 2017; Sotero, 2006; Walters et al., 2011), less is known about current risk and protective factors associated with mental health in AI/AN/NH older adults in the United States. A 2017 literature review found that AI/AN/NH adults may have a lower or similar prevalence of depression and anxiety disorders compared to non-AI/AN/NH adults, but a higher prevalence of post-traumatic stress disorder (Kisely et al., 2017). A 2020 analysis of 818 AI Elders in the Strong Heart Study found that 20% reported depressive symptoms (Suchy-Dicey et al., 2020), compared to the national general estimates of 5-10% (Blazer, 2003). Additionally, in 2020, AI/AN people had the highest rate of suicide across all age groups, commonly linked to depression, at 23.9 per 100,000 compared to 16.9 per 100,000 for non-Hispanic Whites (Ehlman et al., 2022). As noted above, AI/AN/NH Elders experience structural inequities, including greater disparities in education, income, and housing compared to older adults from the White population of the U.S., which may contribute to higher rates of suicide and lower life expectancy (Adamsen et al., 2018; Pettit et al., 2014; Suchy-Dicey et al., 2020). While AI/AN/NH Elders have faced historical trauma and structural inequities, they also exhibit significant resilience through cultural continuity, community engagement, and traditional healing practices (Viscogliosi et al., 2020). It is important to explore both the risk and protective factors associated to mental health in the population.

A major risk factor for depression and declining mental health for older adults is the presence of a disability, which is commonly operationalized by counting limitations in Activities of Daily Living (ADL; including bathing, dressing, toileting, transferring, eating, and walking) and Instrumental Activities of Daily Living (IADL; including cooking, cleaning, shopping, managing money, and going out of the house). Similarly, secondary analyses of the National Social Life, Health, and Aging Project (Na & Streim, 2017) and the Medicare Health Outcomes Survey (Albanese et al., 2020) suggest that mental health declines as ADL limitations increase, and an analysis of data from the Fordham Centenarian Study found that IADL limitations were also associated with depression (Jopp et al., 2016).

Social support is seen as a protective factor for good mental health in later life in the general population (Gariépy et al., 2016), while family caregiving has been seen as both a risk and

protective factor. Schure and Goins (2015) found a positive correlation between depressive symptomology and receipt of informal caregiving for AI Elders. However, it is also recognized that, among AI/AN/NH Elders, family care for a dependent member aligns with family values and is positively associated with participation in cultural events (Goins et al., 2010). In regards to caring for grandchildren, research in AI/AN/NH communities has found that this is expected and important, but it also can be associated with economic and social hardships for Elders (Lewis et al., 2018; Mokuau et al., 2015). Such hardships regarding poor economic status and social impacts can be detrimental to mental health status.

Social engagement is a protective factor in the general population (Ertel et al. 2008; Lee et al., 2012) and AI/AN/NH Elders. Studies have pointed out the protective role of cultural practice and community involvement in the mental health status of AI/AN/NH peoples (Adamsen et al., 2021; Browne et al., 2020; Howell & Bardach, 2018; Nelson et al., 2013; Rasmus et al., 2019). For AI/AN/NH peoples, cultural practice is not just about entertainment. Rather, it often involves speaking, learning, or teaching AI/AN/NH languages; eating traditional foods; honoring traditional customs and spiritual practices; and participating in ceremonies and activities with family, friends, and other community members (Adamsen et al., 2021; Redvers & Blondin, 2020; Lewis, 2011).

To learn more about the risks and protective factors for mental health of AI/AN/NH Elders, we analyzed data from the 2017-2020 *Identifying Our Needs (ION): A Survey of Elders* needs assessment administered by the University of North Dakota (UND) National Resource Center on Native American Aging. The assessment collected health and social data from AI/AN/NH Elders participating in nutrition and caregiver programs funded through Title VI of the Older Americans Act (Older American Act, 1965; Administration for Community Living, 2023). Results are used by Tribes to estimate the current health status of their older members, identify needs for services, and satisfy needs assessment requirements associated with Title VI funding (Adamsen et al., 2021, 2018; Schroeder, 2019). The needs assessment was analyzed to test the hypotheses that: 1) participation in family, cultural, and social activities are associated with better mental health; 2) high ADL/IADL limitation scores are associated with poorer mental health; and 3) status of grandparent caregiver is associated with lower mental health.

METHODS

Survey Data

This paper examined data from the 2017-2020 Identifying Our Needs (ION): A Survey of Elders, a survey of AI/AN/NH Elders receiving nutrition, socialization, and caregiver-assistance services through Title VI of the Older Americans Act (Older American Act, 1965; Administration for Community Living, 2023). Data were collected from 23,427 AI/AN/NH Elders, representing more than 258 Tribes, Native villages, and communities. These Elders are affiliated with 168 Title VI programs serving AI Elders, 28 programs serving AN Elders, and one program serving NH Elders. The ION instrument included 72 items on general health status, hospitalizations, ADL and IADL limitations, health behaviors, health care access, social engagement, household size, caregiving, mental health, service needs, and sociodemographics (for more information, please see Adamsen et al., 2021, 2018; Schroeder, 2019).

Data Access and Ethical Approvals

The assessment and analysis of associated data were approved by UND under protocol IRB-200712-139. Additionally, each participating Tribe has passed a tribal resolution or other form of permission document required by the AI/AN/NH community's governing body to authorize data processing. In some instances, this can also include approvals that are necessary by the tribe's institutional review board. The data remain the property of the AI/AN/NH Tribes, villages, and communities that supplied them and are not available for public use without the express permission of the Tribes. The UND is entrusted by Tribes as the repository of data and, per tribal agreements, all data must remain on the UND server for analysis. UND staff analyze tribal-level data and provide reports directly to Tribes. UND staff also have permission to publicly share analyses related to aggregated data.

Setting

The primary purpose of the ION: A Survey of Elders was to fulfill a needs assessment requirement for the Title VI grant application process. The survey was distributed by over 200 Title VI programs, which made a standardized recruitment approach not feasible. Instead, individual Title VI programs were responsible for implementing recruitment methods that worked best for their programs and communities. A convenience sample approach was most often used with each program surveying Elders who meet their eligibility criteria through program outreach

rather than random selection. No incentive was offered by the researchers for completion of the survey. Participants were allowed to self-administer the survey, or a Title VI program staff member could assist administrating the survey.

Participants

Due to the decentralized nature of the survey administration, refusal rates and data on the general health and independence of the program participants were not collected. From the 23,427 Elders who completed the needs assessment, we excluded 2,333 participants who did not identify as AI, AN, or NH; 1,805 participants who reported their age as less than the Title VI program age requirement of 55 years; and 146 records that were missing data for the section on mental health. Thus, the analytical sample in this study was 19,143 Elders, including 17,184 AI Elders, 1,521 AN Elders, and 438 NH Elders.

Measures

Dependent Variable

The revised Mental Health Index-5 (R-MHI-5) was used to assess mental health status on the needs assessment questionnaire. The R-MHI-5 has five questions: during the past month, how much of the time (1) were you a happy person, (2) have you felt calm and peaceful, (3) have you been a very nervous person, (4) have you felt downhearted and blue, (5) have you felt so down in the dumps that nothing could cheer you up? Four response options were offered: 1 = all of the time; 2 = most of the time; 3 = some of the time; and 4 = none of the time (Berwick et al., 1991; Veit et al., 1983). The first two items were reverse coded, responses were added together, and the sum was transformed into a 0 to 100 score, where 100 represents optimal mental health. Published norms suggest that R-MHI-5 mean scores for adults increase with age and that scores for adults ages 55 years and older range from 73.99 to 76.87 (Ware et al., 1993). Although the validity of the R-MHI-5 has limitations (Rumpf et al., 2001), numerous researchers believe it is an acceptable short assessment for depression in general (Thorsen et al., 2013) and among older adults (Friedman et al., 2005).

Explanatory Variables

These variables included sociodemographics, ADL and IADL limitations, living arrangements, caregiving, participation in cultural practices, and participation in social activities.

Missing values in the explanatory variables were coded as "unknown" to retain the sample size (Dong & Peng, 2013).

Sociodemographic Variables. AI/AN/NH group (AI, AN, and NH) was tested as an explanatory variable to examine the difference in R-MHI-5 score by group, with AI serving as the reference group. Most other sociodemographic variables were recoded. Age categories were 55-64, 65-74, 75-85, and 85+. Sex was coded as male or female. Education was coded as high school or lower, college/technical school, or graduate/professional school. Employment status was coded as full/part-time, retired, or not employed. The reference groups for regression were male, age group 55-64, high school of less education, and full/part-time employment.

ADL and IADL Limitations. Both ADL and IADL were calculated from the questions "because of a health or physical problem that lasted more than 3 months, did you have any difficulty with….". Elders marked yes or no for six ADL items: bathing or showering; dressing; eating; getting in or out of bed; walking; and using the toilet, including getting to the toilet. They also marked yes or no for six IADL items: preparing your own meals; shopping for personal items; using the telephone; doing heavy housework; doing light housework; and getting outside. The six ADL items were summed and then categorized into three groups: no limitations, 1-2 limitations, and 3 or more limitations. This was repeated for the six IADL items. The reference groups for regression were zero ADL limitations and zero IADL limitations.

Living Arrangements. Living arrangement and household size data were combined into one variable with four categories: lives with family and household size 2-3, lives with family and household size 4+, lives with non-family, and lives alone. The group of "live with non-family" was not separated by household size due to the limited sample size; this category also included households with non-family and family members living together. The reference group for regression was "lives alone."

Caregiving. The two caregiving questions were: "do you have a family member providing care for you" and "do you take care of grandchildren." The response options were "yes" or "no." For both variables, "no" was the reference group.

Cultural Practice and Social Activity Variables. The cultural practice variable question was, "How often do you participate in cultural practices that include traditional food, music, and customs?" Response options were none of the time (reference group), some of the time, most of the time, or all of the time. The social activity variable question was, "How many times per month do you get out and socialize, for example to attend church/ religious meetings, clubs/organizations

you belong to, or cultural activities/traditional ceremonies?" Participants were prompted to fill in the blank with a number and the numbers are grouped as: 0 times, 1-2 times, 3-4 times, 5-8 times, or 9 or more times.

Statistical Analysis

Statistical software R (version 4.1.0) was used for the analyses. We conducted descriptive analyses for the entire sample and by the three AI/AN/NH groups (mean and standard deviation for continuous variables, frequency and proportion for categorical variables). To examine the association between the explanatory variables and R-MHI-5 score, we performed sequential multivariable linear regression models controlling for different subsets of explanatory variables: model 1 included only sociodemographic variables; model 2 added ADL and IADL limitations; and model 3 added factors, including living arrangement, caregiving variables, cultural practice, and social activity. For linear regression analysis, we reported regression coefficients, 95% confidence intervals (CIs), and the corresponding *p*-values. Significance was based on $p < 0.05$. Intercepts were included in the model, referring to the mean R-MHI-5 score for the reference group.

RESULTS

The characteristics of the sample by AI/AN/NH group are shown in **Table 1**, and the differences were significant (p<.01) for each of the variables. The dependent variable, mean R-MHI-5 score ($\alpha = 0.812$), varied significantly across groups with the lowest (76.0) in the AI group and highest (80.9) in the NH group.

Across all groups, females were overrepresented (AI = 61.0%, AN = 57.3%, and NH = 74.9%) compared to males. The AI group had the highest percentage of the youngest Elders aged 55 to 64 years (33.9%) who qualify for Title VI services but are not yet eligible for entitlement programs such as Medicare, and the NH group had the highest percentage of the oldest age group of 85+ (20.3%). For education, 43.2% of the AI and 40.2% of the NH groups reported attending college and above, compared to 32.4% of the AN group. Perhaps as a reflection of the difference in age distribution, the AI group had a higher proportion of Elders working full-time or part-time (30.4%), while the NH group had the highest percentage of retirees (42.5%).

Despite having the youngest age distribution, 38.3% of AI Elders reported one or more ADL limitations, compared to 33.7% of AN and 26.3% of NH Elders. Similarly, the presence of IADL limitations was the highest among AI Elders, with 44.2% reporting one or more limitations, compared to 38.0% of AN and 31.1% of NH Elders.

Approximately 40% of each group were living with family members in households of two to three people, about 20-25% of each group lived in households with four or more family members, and between 21-28% of each group lived alone. Less than 9% of each group lived with non-family.

In terms of cultural practice frequency, the NH group was most likely to report consistent engagement, with 32.4% saying "all the time" or "most of the time," compared to 28% of AN and 20.1% of AI Elders. The AI group was most likely to report no time spent in cultural practice, with 28.9% saying "none of the time." For the open-ended question on the frequency of social activity, 13.5% of the overall sample reported no social activity in a month (writing 0 in the blank). However, 62.6% of NH Elders reported engaging in social activity five or more times per month, compared to 40.6% of AN and 36.2% of AI Elders.

About 32% of overall respondents reported that a family member provided care for them. The percentage was highest in AI Elders (32.8%) and lowest in the NH group (26.3%), likely reflecting that more AI and fewer NH Elders reported ADL and IADL limitations. About one-fourth (25%) of the respondents across the groups reported taking care of grandchildren.

Table 1.
Sample characteristics for the total sample and by AI/AN/NH group[a]

	All	American Indian	Alaska Native	Native Hawaiian
	N=19,143	N=17,184	N=1,521	N=438
	Mean ± SD	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**
Mental health R-MHI-5	76.3±16.7	76.0±16.7	77.9±16.4	80.9±15.7
	N (%)	**N (%)**	**N (%)**	**N (%)**
Sex				
Male	7,208 (37.7)	6,478 (37.7)	624 (41.0)	106 (24.2)
Female	11,686 (61.0)	10,486 (61.0)	872 (57.3)	328 (74.9)
Unknown	249 (1.3)	220 (1.3)	25 (1.6)	4 (0.9)
Age Group				
55-64	6,271 (32.8)	5,823 (33.9)	373 (24.5)	75 (17.1)
65-74	6,928 (36.2)	6,177 (35.9)	606 (39.8)	145 (33.1)
75-84	3,349 (17.5)	2,877 (16.7)	343 (22.6)	129 (29.5)
85+	2,595 (13.6)	2,307 (13.4)	199 (13.1)	89 (20.3)

continued on next page

Table 1 continued
Sample characteristics for the total sample and by AI/AN/NH group[a]

	All N=19,143	American Indian N=17,184	Alaska Native N=1,521	Native Hawaiian N=438
Education				
High school or less	10,709 (55.9)	9,465 (55.1)	985 (64.8)	259 (59.1)
College/Tech	6,802 (35.5)	6,221 (36.2)	437 (28.7)	144 (32.9)
Graduate/Professional	1,289 (6.7)	1,200 (7.0)	57 (3.7)	32 (7.3)
Unknown	343 (1.8)	298 (1.7)	42 (2.8)	3 (0.7)
Employment				
Full/Part-time	5,688 (29.7)	5,229 (30.4)	374 (24.6)	85 (19.4)
Retired	4,495 (23.5)	3,880 (22.6)	429 (28.2)	186 (42.5)
Not employed	8,088 (42.3)	7,281 (42.4)	650 (42.7)	157 (35.8)
Unknown	872 (4.6)	794 (4.6)	68 (4.5)	10 (2.3)
# of ADL Limitations				
0	11,930 (62.3)	10,599 (61.7)	1,008 (66.3)	323 (73.7)
1-2	5,087 (26.6)	4,654 (27.1)	356 (23.4)	77 (17.6)
3 or more	2,126 (11.1)	1,931 (11.2)	157 (10.3)	38 (8.7)
# of IADL Limitations				
0	10,832 (56.6)	9,587 (55.8)	943 (62.0)	302 (68.9)
1-2	5,420 (28.3)	4,981 (29.0)	355 (23.3)	84 (19.2)
3 or more	2,891 (15.1)	2,616 (15.2)	223 (14.7)	52 (11.9)
Living arrangement				
Living alone	4,837 (25.3)	4,313 (25.1)	430 (28.3)	94 (21.5)
With family, hhsize[b] 2-3	7,398 (38.7)	6,649 (38.7)	574 (37.7)	175 (40.0)
With family, hhsize [b] 4+	3,991 (20.9)	3,581 (20.8)	300 (19.7)	110 (25.1)
With non-family	1,426 (7.5)	1,289 (7.5)	98 (6.4)	39 (8.9)
Unknown	1,491 (7.8)	1,352 (7.9)	119 (7.8)	20 (4.6)
Cultural practice frequency				
None of the time	5,375 (28.1)	4,966 (28.9)	318 (20.9)	91 (20.8)
Some of the time	8,982 (46.9)	8,065 (46.9)	721 (47.4)	196 (44.7)
Most of the time	2,451 (12.8)	2,105 (12.2)	267 (17.6)	79 (18.0)
All of the time	1,583 (8.3)	1,362 (7.9)	158 (10.4)	63 (14.4)
Unknown	752 (3.9)	686 (4.0)	57 (3.7)	9 (2.1)
Social activity per month				
0 times	2,578 (13.5)	2,337 (13.6)	195 (12.8)	46 (10.5)
1-2 times	3,516 (18.4)	3,244 (18.9)	236 (15.5)	36 (8.2)
3-4 times	3,967 (20.7)	3,583 (20.9)	320 (21.0)	64 (14.6)
5-8 times	2,931 (15.3)	2,633 (15.3)	231 (15.2)	67 (15.3)
9 or more	4,183 (21.9)	3,589 (20.9)	387 (25.4)	207 (47.3)
Unknown	1,968 (10.3)	1,798 (10.5)	152 (10.0)	18 (4.1)
Family member provided care for me				
No	12,181 (63.6)	10,879 (63.3)	987 (64.9)	315 (71.9)
Yes	6,208 (32.4)	5,632 (32.8)	461 (30.3)	115 (26.3)
Unknown	754 (3.9)	673 (3.9)	73 (4.8)	8 (1.8)
Take care of grandchildren				
No	13,121 (68.5)	11,708 (68.1)	1,089 (71.6)	324 (74.0)
Yes	5,295 (27.7)	4,820 (28.0)	367 (24.1)	108 (24.7)
Unknown	727 (3.8)	656 (3.8)	65 (4.3)	6 (1.4)

[a] The p-values for the tests of group differences are <0.01.
[b] hhsize: household size

Findings from the regression models, with R-MHI-5 score as the dependent variable, are shown in **Table 2**. In Model 1, including sociodemographic characteristics, most associations were significant. Being NH was associated with a 4.76-point increase in R-MHI-5 score. The older age groups had higher R-MHI-5 scores than those aged 55-64. In all groups, having more education was associated with higher R-MHI-5 scores. For instance, Elders with college or technical school education had a 1.28-point higher R-MHI-5 score, and Elders with graduate/professional education had a 1.54-point higher R-MHI-5 score compared to Elders with high school or less education. Lower scores were associated with being female (-1.92), being retired (-2.33), and being unemployed (-4.10).

Model 2 added ADL and IADL limitations to Model 1. As expected, AI/AN/NH Elders with ADL or IADL difficulties had worse mental health than those without ADL or IADL difficulties. Specifically, scores exponentially worsened for Elders with one or two ADL limitations (-3.18) and three or more limitations (-6.11). Similarly, scores worsened for Elders with one to two IADL limitations (-4.32) and three or more IADL limitations (-8.28).

Model 3 added living arrangement, cultural practice, social activity, and caregiving variables to Model 2 (see Table 2). Adding these variables did not change the significant negative associations between ADL/IADL limitations and the R-MHI-5 scores as seen in Model 2. The ideal living arrangement appeared to be with a family with a household size of 2-3 (+0.82) compared to living alone, whereas living with a non-family was associated with lower R-MHI-5 scores (-2.05). Engaging in cultural practice “all of the time” was also associated with significantly higher R-MHI-5 scores (+2.28) compared to those who reported never engaging in cultural practices. Participation in social activity was associated with higher R-MHI-5 scores, from +2.12 points for one activity per month to +6.10 for nine or more activities per month. Controlling for ADL and IADL limitations and other covariates, Elders who were caregiving recipients had a slightly higher R-MHI-5 score (+0.92) compared to those who were not receiving care, whereas taking care of grandchildren was associated with a lower R-MHI-5 score (-1.16) compared to non-caregivers. Across all three models, being NH was significantly associated with a higher R-MHI-5 score.

Table 2.
Linear regression analysis of R-MHI-5

	Model 1[a] Beta	*p*	Model 2[b] Beta	*p*	Model 3[c] Beta	*P*
Intercept[d]	77.26 (76.63, 77.89)	<0.001	80.03 (79.34, 80.71)	<0.001	75.51 (74.57, 76.45)	<0.001
Sex (Ref: Male)						
Female	-1.92 (-2.40, -1.43)	<0.001	-1.53 (-2.00, -1.06)	<0.001	-1.65 (-2.12, -1.18)	<0.001
Unknown	-2.85 (-4.94, -0.76)	0.008	-2.56 (-4.57, -0.56)	0.012	-2.91 (-4.89, -0.93)	0.004
Age Group (Ref: 55-64)						
65-74	2.38 (1.79, 2.97)	<0.001	2.24 (1.68, 2.81)	<0.001	2.01 (1.45, 2.57)	<0.001
75-84	4.00 (3.26, 4.74)	<0.001	4.00 (3.29, 4.72)	<0.001	3.51 (2.80, 4.22)	<0.001
85+	1.98 (1.20, 2.76)	<0.001	2.66 (1.90, 3.41)	<0.001	2.37 (1.61, 3.12)	<0.001
Education (Ref: High school or lower)						
College/Tech	1.28 (0.77, 1.79)	<0.001	1.04 (0.55, 1.53)	<0.001	0.81 (0.32, 1.30)	0.001
Graduate/Professional	1.54 (0.58, 2.50)	0.002	1.22 (0.30, 2.14)	0.01	0.72 (-0.20, 1.63)	0.127
Unknown	1.43 (-0.35, 3.21)	0.115	1.01 (-0.70, 2.72)	0.249	0.62 (-1.07, 2.32)	0.472
Race/ethnicity (Ref: American Indian)						
Alaska Native	1.83 (0.96, 2.70)	<0.001	1.24 (0.40, 2.07)	0.004	0.96 (0.13, 1.78)	0.024
Native Hawaiian	4.76 (3.18, 6.33)	<0.001	3.36 (1.85, 4.88)	<0.001	2.43 (0.93, 3.94)	0.002
Employment (Ref: Full/Part-time)						
Retired	-2.33 (-3.03, -1.63)	<0.001	-0.28 (-0.96, 0.40)	0.418	-0.55 (-1.23, 0.12)	0.11
Not employed	-4.10 (-4.69, -3.51)	<0.001	-1.20 (-1.79, -0.62)	<0.001	-1.36 (-1.94, -0.77)	<0.001
Unknown	-4.20 (-5.40, -3.00)	<0.001	-2.44 (-3.59, -1.29)	<0.001	-2.78 (-3.93, -1.64)	<0.001
# of ADL Difficulties (Ref: 0)						
1-2			-3.18 (-3.83, -2.54)	<0.001	-3.08 (-3.72, -2.44)	<0.001
3 or more			-6.11 (-7.09, -5.13)	<0.001	-5.96 (-6.93, -4.98)	<0.001
# of IADL Difficulties (Ref: 0)						
1-2			-4.32 (-4.95, -3.69)	<0.001	-4.26 (-4.88, -3.63)	<0.001
3 or more			-8.28 (-9.19, -7.37)	<0.001	-7.92 (-8.84, -7.01)	<0.001
Living arrangement (Ref: Living alone)						
With family, hhsize[e] 2-3					0.82 (0.24, 1.40)	0.006
With family, hhsize[e] 4+					0.14 (-0.54, 0.81)	0.692
With non-family					-2.05 (-2.98, -1.12)	<0.001
Unknown					0.10 (-0.93, 1.13)	0.845
Cultural practice frequency (Ref: None of the time)						
Some of the time					-0.27 (-0.82, 0.29)	0.345
Most of the time					0.68 (-0.10, 1.46)	0.087
All of the time					2.28 (1.37, 3.19)	<0.001
Unknown					2.78 (1.44, 4.13)	<0.001
Social activity per month (Ref: 0 times)						
1-2 times					2.12 (1.29, 2.94)	<0.001
3-4 times					2.87 (2.07, 3.68)	<0.001
5-8 times					4.84 (3.98, 5.70)	<0.001
9 or more					6.10 (5.29, 6.91)	<0.001
Unknown					4.43 (3.44, 5.42)	<0.001
Family provide care for me (Ref: No)						
Yes					0.92 (0.39, 1.45)	<0.001
Unknown					2.21 (0.53, 3.90)	0.01
Take care of grandchildren (Ref: No)						
Yes					-1.16 (-1.70, -0.61)	<0.001
Unknown					-1.06 (-2.77, 0.66)	0.226

[a] Model 1 is adjusted for sociodemographics.
[b] Model 2 has ADLs/IADLs added to Model 1.
[c] Model 3 has a living arrangement, cultural practice, social activity, and caregiving variables in addition to variables in Model 2.
[d] Intercept: mean MHI_100 for the reference group.
[e] hhsize: household size

DISCUSSION

Findings from this quantitative analysis of assessment data collected from 19,143 AI/AN/NH Elders suggest that the mean R-MHI-5 score for this AI/AN/NH sample (76.3) was similar to national norms for all U.S. adults 55 years and older (last estimated in the 1990s at 76.9 for Elders ages 65-74 years and 74.0 for Elders aged 75+ years) (Ware et al., 1993). As expected, R-MHI-5 scores were higher in Elders living with family, engaging in cultural and social activities, with fewer ADL/IADL limitations, and fewer caregiving responsibilities (Albanese et al., 2020; Ertel et al., 2008; Jopp et al., 2016; Lee et al., 2012; Na & Streim, 2017; Ware et al., 1993).

Research suggests that activity participation, such as traditional and cultural activities, is linked to individual well-being because social activity increases perceptions of social support (Adams et al., 2011). Mackenzie and Abdulrazak (2021) also found a strong association between a number of social activities and measures of social engagement (defined as the number of friends and family they see, feel close to, and can discuss personal matters with) in their cross-sectional study of Canadian Elders. In other words, individuals participating in more social activities are likely to report more social support and less psychological distress. This suggests that perhaps simple measures of social participation, like those used in this assessment, may serve as proxy measures for social support.

The caregiving variables suggested that receiving care was associated with a slightly higher R-MHI-5 score (+0.92) and caring for grandchildren was associated with a slightly lower score (-1.16). These single-item variables likely do not do justice to caregiving situations, as the reasons for receiving care and the reasons for caring for grandchildren are not known. Research suggests that AI/AN/NH Elders prefer to receive care from family members than strangers (Braun et al., 2014). However, research also suggests that some family caregivers are better at providing care than others, with younger caregivers, caregiving sons, and caregivers living elsewhere meeting fewer of the Elder's needs compared to older, female family members living with the Elder (Beach & Schulz, 2017). Elders who care for grandchildren do so under many different circumstances, from occasional babysitting to becoming guardians and full-time caregivers for grandchildren whose parents are incapable or unavailable to provide that care (Hill, 2016). Also, the consequences of caring for grandchildren likely differ by the Elder's financial circumstances and culture. For example, Chen and colleagues (2015) found that grandparents co-residing with grandchildren experience more health deterioration than those who do not, and that living in a

skipped generation household may be particularly detrimental to health, especially for grandparents with limited financial and social resources. Overall, despite the positive aspects of caregiving, such as a sense of fulfillment (Jennings et al., 2021), without proper support, caregiving can be associated with increased levels of caregiving burden, depression, and anxiety (Hong et al., 2023; Schulz et al., 2008; Yao et al., 2024). Furthermore, grandparents taking care of grandchildren with severe physical illness experience added challenges related to emotional fear and lack of formal help (Priboi et al., 2022).

The NH group had a higher mean R-MHI-5 score of 80.1 compared to the other groups. NH Elders were also more likely to report engaging in cultural practices all or most of the time (34.2% vs. 21.1% for the entire sample) and participating in five or more social activities per month (62.6% vs. 37.2% for the entire sample). NHs were the group of Elders with the highest proportion of retirees, which may impact the higher rates of cultural and social participation.

A possible explanation may stem from the fact that the NH history and ongoing experience with colonization, while devastating, differs in important ways from the experience of AI and AN people (Muneoka et al., 2021). Unlike with AI peoples, the United States did not establish treaties with NH groups. Rather, the sovereign kingdom of Hawai‘i was illegally overthrown by the U.S. military and annexed in 1898. Only seven schools in Hawai‘i were funded by the federal government to assimilate Native Hawaiian children, but the experience was different than that experienced by many AI and AN children who were removed from their families and sent to faraway boarding schools (Sebwenna-Painter et al., 2023). Also, there is just one Native Hawaiian language with more than 90% of Hawai‘i residents literate in written Hawaiian before children were banned from using it in the schools, whereas hundreds of AI and AN languages exist (and many have been lost) making it difficult to maintain Native language fluency. In 1978, the Hawai‘i constitution was amended to make Hawaiian an official language, and today a good number of public elementary and secondary schools teach only in Hawaiian. Also, Hawai‘i is seen as a dreamy tourist destination, and the romanticizing and broad accessibility of Hawaiian culture may have reduced racist attitudes toward this group compared to AI/ANs. Future studies need to incorporate each group's historical and cultural narratives to fully understand the context of health and activities.

Limitations

This study had several limitations. First, the R-MHI-5 questions usually offer six response options and yield scores of 6 to 30, which are transformed from 0 to 100 using the standard linear

transformation (Ware et al., 2000). However, in the UND assessment survey, only four response options were provided. Based on feedback from staff that administered the survey, two response options were left out: "a good bit of the time" and "a little of the time," as staff noted difficulties explaining to Elders the difference between these and adjacent items (e.g., "a good bit of the time" and "most of the time"). Although these changes are acknowledged as a limitation, they are also a strength given that they made the survey more accessible to AI/AN/NH Elders.

Additionally, the items measuring participation in cultural practices and participation in social activities (which included cultural activities and traditional ceremonies as well as religious and organizational meetings) were somewhat conflated. However, these items were measured slightly differently; response options for participation in cultural activities were from never to always, while the response option for frequency of participation in social activities was open-ended.

Variables not included in the assessment have also been shown to negatively affect mental health status, including perceived racial discrimination (William et al., 2019) and experiences with ageism (Lyons et al, 2018). These two constructs are usually measured with multi-item scales but to add additional questions to an already-long assessment would require a search for single-item measures for race and age discrimination, which we may consider for future iterations of the questionnaire.

Lastly, in order to be included in the survey sample, Tribes, Tribal organizations, and NH-serving organizations had to be part of a Title VI program. This meant that they needed to have at least 50 people aged 60+ to be eligible for services and thus participate in the survey, so smaller Tribes and NH communities were not represented in the sample. Also, urban AI/AN peoples are not in the sample, although urban NH did participate in the survey. These limitations result in a lack of generalizability of the sample to all AI/AN/NH Elders in the United States, especially those living in urban settings. Regardless, there are no other samples of this large of a scope to learn from.

CONCLUSION

This study confirms that living with family and frequent participation in social and cultural activities are protective of mental health, while the effects of receiving care and caring for grandchildren are mixed. Thus, incorporating traditional or cultural practices into Eldercare programming is of great importance, as it provides other opportunities for socialization and program support with ADL and IADL limitations and caregiving. The Title VI program of the

U.S. Administration for Community Living funds AI/AN/NH communities to provide these types of services to their Elders, but funding should be expanded as the number of AI/AN/NH Elders continues to grow. Additional federal, state, and local agencies are also encouraged to fund services to help support the growing Elder population. For instance, funding opportunities and policies to support community-based programs that can understand and incorporate tribal culture and community relationships are critical in supporting the needs of the increasing number of diverse aging populations.

REFERENCES

Adams, K.B., Leibbrandt, S., & Moon, H. (2011). A critical review of the literature on social and leisure activity and wellbeing in later life. *Ageing & Society*, *31*(4), 683–712. https://doi:10.1017/S0144686X10001091

Adamsen, C., Manson, S. M., & Jiang, L. (2021). The association of cultural participation and social engagement with self-reported diagnosis of memory problems among American Indian and Alaska Native Elders. *Journal of Aging and Health*, *33*(7-8_suppl), 60S–67S. https://doi.org/10.1177/08982643211014971

Adamsen, C., Schroeder, S., LeMire, S., & Carter, P. (2018). Education, income, and employment and prevalence of chronic disease among American Indian/Alaska Native Elders. *Preventing Chronic Disease*, *15*, E37. https://doi.org/10.5888/pcd15.170387

Administration for Community Living, (2021). 202 Profile of American Indians and Alaska Natives Age 65 and Older. https://acl.gov/sites/default/files/Profile%20of%20OA/AIANProfileReport2021.pdf

Administration for Community Living. (2023). Services for Native Americans (OAA Title VI). https://acl.gov/programs/services-native-americans-oaa-title-vi

Albanese, A. M., Bartz-Overman, C., Parikh Md, T., & Thielke, S. M. (2020). Associations between activities of daily living independence and mental health status among Medicare managed care patients. *Journal of the American Geriatrics Society*, *68*(6), 1301–1306. https://doi-org.eres.library.manoa.hawaii.edu/10.1111/jgs.16423

Arroyo, C., Hu, F. B., Ryan, L. M., Kawachi, I., Colditz, G. A., Speizer, F. E., & Manson, J. (2004). Depressive symptoms and risk of type 2 diabetes in women. *Diabetes Care*, *27*(1), 129–133. https://doi.org/10.2337/diacare.27.1.129.

Beach, S. R., & Schulz, R. (2017). Family caregiver factors associated with unmet needs for care of older adults. *Journal of the American Geriatrics Society*, *65*(3), 560–566. https://doi.org/10.1111/jgs.14547

Berwick, D. M., Murphy, J. M., Goldman, P. A., Ware Jr, J. E., Barsky, A. J., & Weinstein, M. C. (1991). Performance of a five-item mental health screening test. *Medical Care*, 169-176. https://doi.org/10.1097/00005650-199102000-00008

Blazer, D.G. (2003). Depression in late life: review and commentary. *Journal of Gerontology Series A Biological and Medical Sciences,* *58*(3), M249–265. https://doi.org/10.1093/gerona/58.3.m249

Blazer D. G. (2000). Psychiatry and the oldest old. *American Journal of Psychiatry*, *157*(12), 1915–1924. https://doi.org/10.1176/appi.ajp.157.12.1915

Braun, K. L., Browne, C. V., Ka'opua, L. S., Kim, B. J., & Mokuau, N. (2014). Research on Indigenous Elders: From positivistic to decolonizing methodologies. *The Gerontologist*, *54*(1), 117–126. https://doi-org.ezproxylr.med.und.edu/10.1093/geront/gnt067.

Brave Heart, M. Y., & DeBruyn, L. M. (1998). The American Indian holocaust: Healing historical unresolved grief. *American Indian and Alaska Native Mental Health Research*, *8*(2), 56–78. http://dx.doi.org/10.5820/aian.0802.1998.60

Browne, C. V., Braun, K. L., Mokuau, N. K., Wu, Y. Y., & Muneoka, S. (2020). Examining long-term service and support needs and preferences of Native Hawaiian Elders: A mixed-method approach. *Journal of Aging and Health*, *32*(7-8), 582–590. https://doi.org/10.1177/0898264319839903.

Chavez, N., & Kaur, H. (2021, August 19). Why the jump in the Native American population may be one of the hardest to explain. *CNN Edition*. https://edition.cnn.com/2021/08/19/us/census-native-americans-rise-population/index.html

Chen, F., Mair, C. A., Bao, L., & Yang, Y. C. (2015). Race/ethnic differentials in the health consequences of caring for grandchildren for grandparents. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *70*(5), 793–803. https://doi.org/10.1093/geronb/gbu160

Cheruvu, V.K., & Chiyaka, E.T. (2019). Prevalence of depressive symptoms among older adults who reported medical cost as a barrier to seeking health care: Findings from a nationally representative sample. *BMC Geriatrics, 19*, 192. https://doi.org/10.1186/s12877-019-1203-2

de Leeuw, S., Lindsay, N. M., & Greenwood, M. (2015). Introduction to the second edition: Rethinking (once again) determinants of Indigenous peoples' health. In M. Greenwood, S. de Leeuw, N. M. Lindsay, & C. Reading (Eds.), *Determinants of Indigenous peoples' health: Beyond the social* (2nd ed., pp. xvii–xlv). Canadian Scholars' Press.

Dong Y, Peng CY. (2013). Principled missing data methods for researchers. *SpringerPlus, 14*(1), 222. https://doi.org/10.1186/2193-1801-2-222

Ehlman, D.C., Yard, E., Stone, D. M., Jones, C. M., & Mack, K. A. (2022). Changes in suicide rates—United States, 2019 and 2020. *MMWR Morbidity and Mortality Weekly Report, 71*, 306-312. http://dx.doi.org/10.15585/mmwr.mm7108a5

Ertel, K. A., Glymour, M. M., & Berkman, L. F. (2008). Effects of social integration on preserving memory function in a nationally representative US Elderly population. *American Journal of Public Health*, *98*(7), 1215–1220. https://doi.org/10.2105/AJPH.2007.113654.

Friedman, B., Heisel, M., & Delavan, R. (2005). Validity of the SF-36 five-item Mental Health Index for major depression in functionally impaired, community-dwelling Elderly patients. *Journal of the American Geriatrics Society*, *53*(11), 1978–1985. https://doi.org/10.1111/j.1532-5415.2005.00469.x

Gariépy, G., Honkaniemi, H., & Quesnel-Vallée, A. (2016). Social support and protection from depression: Systematic review of current findings in Western countries. *British Journal of Psychiatry*, *209*(4), 284-293. https://doi:10.1192/bjp.bp.115.169094

Gerlach, L. B., Maust, D. T., Solway, E., Kirch, M., Kullgren, J. T., Singer, D. C., & Malani, P. N. (2022). Perceptions of overall mental health and barriers to mental health treatment among U.S. older adults. *American Journal of Geriatric Psychiatry*, *30*(4), 521–526. https://doi.org/10.1016/j.jagp.2021.09.006

Goins, R. T., Spencer, S. M., McGuire, L. C., Goldberg, J., Wen, Y., & Henderson, J. A. (2011). Adult caregiving among American Indians: The role of cultural factors. *The Gerontologist*, *51*(3), 310–320. https://doi.org/10.1093/geront/gnq101

Grandbois, D.M., & Sanders, G.F. (2009). The resilience of Native American Elders. *Issues in Mental Health Nursing, 30*, 569 - 580. https://doi.org/10.1080/01612840902916151

Hill L. (2016). Haudenosaunee grandmothers caring for their grandchildren: The process of assuming the caregiving role. *Journal of Gerontological Social Work*, *59*(4), 281–295. https://doi.org/10.1080/01634372.2016.1214660

Hiratsuka, V. Y., Moore, L., Dillard, D. A., Avey, J. P., Dirks, L. G., Beach, B., & Novins, D. (2017). Development of a screening and brief intervention process for symptoms of psychological trauma among primary care patients of two American Indian and Alaska native health systems. *The Journal of Behavioral Health Services & Research*, *44*, 224-241. https://doi.org/10.1007/s11414-016-9519-6

Howell, B. M., & Bardach, S. H. (2018). "It'sa Social Thing": Sociocultural Experiences with Nutrition and Exercise in Anchorage, Alaska. *Arctic Anthropology*, *55*(2), 1-16. https://doi.org/10.3368/aa.55.2.1

Indian Health Service. (2019). *Indian Health Disparities*. [fact sheet]. https://www.ihs.gov/sites/newsroom/themes/responsive2017/display_objects/documents/factsheets/Disparities.pdf

Jaramillo, E. T., Haozous, E., & Willging, C. E. (2022). The community as the unit of healing: Conceptualizing social determinants of health and well-being for older American Indian adults. *The Gerontologist*, *62*(5), 732-741. https://doi:10.1093/geront/gnac018

Jervis, L. L. (2010). Aging, health, and the indigenous people of North America. *Journal of Cross-Cultural Gerontology*, *25*, 299–301. https://doi.org/10.1007/s10823-010-9130-x

Jopp, D.S., Park, MK.S., Lehrfeld, J. & Paggi, M.E. (2016). Physical, cognitive, social and mental health in near-centenarians and centenarians living in New York City: Findings from the Fordham Centenarian Study. *BMC Geriatrics 16*, 1. https://doi.org/10.1186/s12877-015-0167-0

Kisely, S., Alichniewicz, K. K., Black, E. B., Siskind, D., Spurling, G., & Toombs, M. (2017). The prevalence of depression and anxiety disorders in indigenous people of the Americas: A systematic review and meta-analysis. *Journal of Psychiatric Research*, *84*, 137–152. https://doi.org/10.1016/j.jpsychires.2016.09.032

Kiyoshige, E., Kabayama, M., Gondo, Y., Masui, Y., Inagaki, H., Ogawa, M., Nakagawa, T., Yasumoto, S., Akasaka, H., Sugimoto, K., Ikebe, K., Arai, Y., Ishizaki, T., Rakugi, H., & Kamide, K. (2019). Age group differences in association between IADL decline and depressive symptoms in community-dwelling Elderly. *BMC Geriatrics*, *19*(1), 309. https://doi.org/10.1186/s12877-019-1333-6

Lee, C. T., Yeh, C. J., Lee, M. C., Lin, H. S., Chen, V. C., Hsieh, M. H., Yen, C. H., & Lai, T. J. (2012). Social support and mobility limitation as modifiable predictors of improvement in depressive symptoms in the Elderly: Results of a national longitudinal study. *Archives of Gerontology and Geriatrics*, *55*(3), 530–538. https://doi.org/10.1016/j.archger.2012.03.002.

Lewis, J. P. (2011). Successful aging through the eyes of Alaska Native elders. What it means to be an elder in Bristol Bay, AK. *The Gerontologist*, *51*(4), 540-549. https://doi.org/10.1093/geront/gnr006

Lewis, J. P., Boyd, K., Allen, J., Rasmus, S., & Henderson, T. (2018). "We raise our grandchildren as our own:" Alaska Native grandparents raising grandchildren in Southwest Alaska. *Journal of Cross-Cultural Gerontology*, *33*(3), 265–286. https://doi.org/10.1007/s10823-018-9350-z

Lyons A., Alba, B., Heywood, W., Fileborn, B., Minichiello, V., Barrett, C., Hinchliff, S., Malta, S., & Dow, B. (2018). Experiences of ageism and the mental health of older adults. *Aging & Mental Health*, *22*, 11, 1456-1464, https://doi.org/10.1080/13607863.2017.1364347

Mackenzie, C. S., & Abdulrazaq, S. (2021). Social engagement mediates the relationship between participation in social activities and psychological distress among older adults. *Aging & Mental Health*, *25*(2), 299–305. https://doi.org/10.1080/13607863.2019.1697200

Mokuau, N., Browne, C. V., Higuchi, P., Sweet, K. M., Ka'opua, L. S., & Braun, K. L. (2015). Native Hawaiian grandparents: Exploring benefits and challenges in the caregiving experience. *Journal of Indigenous Social Development*, *4*(1), 1-19. http://hdl.handle.net/10125/37626

Muneoka, S., Braun, K. L., Burrage, R., & Haitsuka, R. K. (2021). No nā hulu kūpuna: A Native Hawaiian view on Elderhood. In Selim H (ed). *Aging across cultures: Growing old in non-Western cultures* (pp.349-366). Springer Nature.

Na, L., & Streim, J. E. (2017). Psychosocial well-being associated with activity of daily living stages among community-dwelling older adults. *Gerontology & Geriatric Medicine*, *3*, 2333721417700011. https://doi.org/10.1177/2333721417700011

National Alliance on Mental Illness. (2024). *Indigenous.* https://www.nami.org/your-journey/identity-and-cultural-dimensions/indigenous/

Nelson, L. A., Noonan, C. J., Goldberg, J., & Buchwald, D. S. (2013). Social engagement and physical and cognitive health among American Indian participants in the health and retirement study. *Journal of Cross-Cultural Gerontology*, *28*(4), 453. https://doi.org/10.1007/s10823-013-9213-6.

Office of the Surgeon General. (2024, August 28). *Current Priorities of the U.S. Surgeon General* [Page]. https://www.hhs.gov/surgeongeneral/priorities/index.html

Pettit, K. L. S., Kingsley, G. T., Biess, J., Bertumen, K., Pindus, N., Narducci, C., & Budde, A. (2014). Continuity and change: Demographic, socioeconomic, and housing conditions of American Indians and Alaska Natives. US Department of Housing and Urban Development.

Priboi, C., Gantner, B., Holmer, P., da Silva, L. N., Tinner, E. M., Roser, K., & Michel, G. (2022). Psychological outcomes and support in grandparents whose grandchildren suffer from a severe physical illness: A systematic review. *Heliyon, 8*(5). https://doi.org/10.1016/j.heliyon.2022.e09365

Rasmus, S. M., Trickett, E., Charles, B., John, S., & Allen, J. (2019). The Qasgiq model as an Indigenous intervention: Using the cultural logic of contexts to build protective factors for Alaska Native suicide and alcohol misuse prevention. *Cultural Diversity & Ethnic Minority Psychology*, *25*(1), 44–54. https://doi.org/10.1037/cdp0000243

Redvers N, Blondin B (2020) Traditional Indigenous medicine in North America: A scoping review. *PLoS ONE*, *15*(8), e0237531. https://doi.org/10.1371/journal.pone.0237531

Rumpf, H. J., Meyer, C., Hapke, U., & John, U. (2001). Screening for mental health: validity of the MHI-5 using DSM-IV Axis I psychiatric disorders as gold standard. *Psychiatry Research*, *105*(3), 243–253. https://doi.org/10.1016/s0165-1781(01)00329-8

Schulz, R., & Sherwood, P. R. (2008). Physical and mental health effects of family caregiving. *The American Journal of Nursing, 108*(9 Suppl), 23–27. https://doi.org/10.1097/01.NAJ.0000336406.45248.4c

Schure, M. B., & Goins, R. T. (2015). Association of depressive symptomatology with receipt of informal caregiving among older American Indians: The Native Elder Care Study. *American Journal of Geriatric Psychiatry*, *23*(6), 579–588. https://doi.org/10.1016/j.jagp.2014.03.013

Schroeder, S., Adamsen, C., & Ward, C. (2019). Dental Care Utilization and Service Needs Among American Indian/Alaska Native/Native Hawaiian Elders: 2008 to 2017. *Journal of Aging and Health*, *31*(10), 1917–1940. https://doi.org/10.1177/0898264318800598

Sebwenna-Painter, K., Beckstein, A., & Kraus, S. (2023). Psychological impacts of historic loss and current events surrounding American Indian boarding schools. *American Indian and Alaska Native Mental Health Research*, *30*(2), 1–21. https://doi.org/10.5820/aian.3002.2023.1

Sotero, M. M. (2006). A conceptual model of historical trauma: Implications for public health practice and research. *Journal of Health Disparities Research and Practice, 1*(1),93-108. http://ssrn.com/abstract=1350062

Suchy-Dicey, A., Verney, S. P., Nelson, L. A., Barbosa-Leiker, C., Howard, B. A., Crane, P. K., & Buchwald, D. S. (2020). Depression symptoms and cognitive test performance in older American Indians: The Strong Heart Study. *Journal of the American Geriatrics Society*, *68*(8), 1739–1747. https://doi.org/10.1111/jgs.16434

Thorsen, S. V., Rugulies, R., Hjarsbech, P. U., & Bjorner, J. B. (2013). The predictive value of mental health for long-term sickness absence: The Major Depression Inventory (MDI) and the Mental Health Inventory (MHI-5) compared. *BMC Medical Research Methodology*, *13*, 115. https://doi.org/10.1186/1471-2288-13-115

United States Census Bureau. (2024, April 26). *Older Population and Aging*. Census.Gov. https://www.census.gov/topics/population/older-aging.html

United States. (1978). Older Americans act of 1965, as amended. Washington, D.C.: Administration on Aging, Office of Human Development Services, U.S. Department of Health, Education, and Welfare.

Veit, C. T., & Ware, J. E., Jr. (1983). The structure of psychological distress and well-being in general populations. *Journal of Consulting and Clinical Psychology*, *51*(5), 730–742. https://doi.org/10.1037//0022-006x.51.5.730

Viscogliosi, C., Asselin, H., Basile, S., Borwick, K., Couturier, Y., Drolet, M. J., Gagnon, D., Obradovic, N., Torrie, J., Zhou, D., & Levasseur, M. (2020). Importance of Indigenous elders' contributions to individual and community wellness: results from a scoping review on social participation and intergenerational solidarity. *Canadian Journal Of Public Health = Revue canadienne de sante publique*, *111*(5), 667–681. https://doi.org/10.17269/s41997-019-00292-3

Walters, K. L., Mohammed, S.A., Evans-Campbell, T., Beltrán, R.E., Chae, D.H., & Duran, B. (2011). Bodies don't just tell stories, they tell histories: Embodiment of historical trauma among American Indians and Alaska Natives. *Du Bois Review, 8*(1), 179-189. https://doi.org/10.1017/S1742058X1100018X

Ware, J. E., Kosinski, M, & Dewey, J. (2000). *How to score version 2 of the SF-36® health survey*. Quality Metric Incorporated.

Ware, J. E., Snow, K. K., Kosinski, M., & Gandek, B. (1993). SF-36 Health Survey: Manual and interpretation guide. New England Medical Center.

Wei, W., Lu, J. G., Galinsky, A. D., Wu, H., Gosling, S. D., Rentfrow, P. J., Yuan, W., Zhang, Q., Guo, Y., Zhang, M., Gui, W., Guo, X. Y., Potter, J., Wang, J., Li, B., Li, X., Han, Y. M., Lv, M., Guo, X. Q., Choe, Y., … Wang, L. (2017). Regional ambient temperature is associated with human personality. *Nature Human Behaviour*, *1*(12), 890–895. https://doi.org/10.1038/s41562-017-0240-0

Wilkins, D. E., & Stark, H. K. (2017). *American Indian politics and the American political system* (4th ed.). Rowman & Littlefield.

Williams, D. R., Lawrence, J. A., Davis, B. A., & Vu, C. (2019). Understanding how discrimination can affect health. *Health Services Research*, *54*(Suppl 2), 1374–1388. https://doi.org/10.1111/1475-6773.13222

Wu, Y.Y., Braun, K.L., Horiuchi, B.Y., Tottori, C., Wilkens, L., & Onaka, A.T. (2017). Life expectancies in Hawai'i: A multi-ethnic analysis of 2010 life tables. *Hawai'i Journal of Medicine and Public Health*, *76*(1), 9-14. https://pmc.ncbi.nlm.nih.gov/articles/PMC5226016/

Yao, H., Li, K., Li, C., Hu, S., Huang, Z., Chen, J., & Xu, Y. (2024). Caregiving burden, depression, and anxiety in informal caregivers of people with mental illness in China: A cross-sectional survey. *BMC Psychiatry, 24*(1), 824. https://doi.org/10.1186/s12888-024-06239-4

ACKNOWLEDGEMENTS

Our sincere thanks to the Title VI grantees and the older adults who participated in this survey from American Indian tribes, Alaska Native villages, and Native Hawaiian communities. We are grateful for the support of Cynthia La Counte and Cecelia D. Aldridge and other projects of the U.S. Administration on Aging's National Resources Centers for Native American Aging.

CONFLICT OF INTEREST

The authors declare they have no known conflicts of interest.

FUNDING INFORMATION

This work was supported, in part, by funding from the US Administration on Community Living, Department of Health and Human Services to Hā Kūpuna National Resource Center for Native Hawaiian Elders at the University of Hawai'i (90OIRC0001), the National Resource Center on Native American Aging at the University of North Dakota (90OIRC0003), and the National Resource Center for Alaska Native Elders (90OIRC0002).

Support also was received from the National Institute of General Medical Sciences (U54GM138062) and the National Institute of Minority Health and Health Disparities (U54MD007601-36) at the National Institutes of Health and the Barbara Cox Anthony Endowment at the University of Hawai'i at Mānoa. Grantees undertaking projects under government sponsorship are encouraged to express freely their findings and conclusions.

AUTHOR INFORMATION

Collette Adamsen, PhD, MPA (Turtle Mountain Band of Chippewa Indians) is the Director of the National Resource Center on Native American Aging and the Resource Center on Native Aging and Disability, the Associate Director for Indigenous Programs & Research and Evaluation at the Center for Rural Health, and a Research Assistant Professor at the University of North Dakota School of Medicine and Health Sciences in Grand Forks, ND.

Miquela Ibrao, PhD, (Laguna Pueblo/Quechan) is Associated Director at the Hā Kūpuna National Resource Center for Native Hawaiian Elders and Assistant Professor in the Thompson School of Social Work and Public Health at the University of Hawai‘i at Mānoa in Mānoa, HI.

Yeonjung Jane Lee, PhD, is an investigator at the Hā Kūpuna National Resource Center for Native Hawaiian Elders and Associate Professor in the Thompson School of Social Work and Public Health at the University of Hawai‘i at Mānoa in Mānoa, HI.

Shelly S. Davis, MPA, MPH, (Turtle Mountain Band of Chippewa Indians) is a research coordinator with the Center for Rural Health at the University of North Dakota School of Medicine and Health Sciences in Grand Forks, ND.

Britteny M. Howell, PhD, CPG, CDP is the Director of the Healthy Aging Research Laboratory and Associate Professor in the Division of Population Health Sciences at the University of Alaska Anchorage in Anchorage, AK.

Vanessa Y. Hiratsuka, PhD, (Diné/Winnemem Wintu) is the co-director at the National Resource Center for Alaska Native Elders and a Senior Researcher in the Department of Research at Southcentral Foundation in Anchorage, AK.

Jordan P. Lewis, PhD, is (Aleut/Sugpiaq) Director at the Center on Aging and Professor in the Thompson School of Social Work and Public Health at the University of Hawai‘i at Mānoa in Mānoa, HI.

Yan Yan Wu, PhD, is an investigator at the Hā Kūpuna National Resource Center for Native Hawaiian Elders and Professor in the Thompson School of Social Work and Public Health at the University of Hawai‘i at Mānoa in Mānoa, HI.

Kathryn L. Braun, DrPH, Director at the Hā Kūpuna National Resource Center for Native Hawaiian Elders and Professor in the Thompson School of Social Work and Public Health at the University of Hawai‘i at Mānoa in Mānoa, HI.