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# Depression and Antidepressant Use among People Living with HIV in Hawaii: Focus on Native Hawaiians

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## Abstract

*Depression, including antidepressant use, has not been widely studied in the HIV-positive population or at all in HIV-positive Native Hawaiians. Of 1,016 clients in Hawaii's HIV Seropositivity and Medical Management Program in 2001-2002, 300 (30%) reported having depression and half reported taking antidepressants. Native Hawaiians had the lowest depression rates of any group. Antidepressant use did not vary by race/ethnicity.*

## Introduction

Depression is a common symptom of HIV disease, with an estimated prevalence of 22%-45% (Penzak et al. 2000). Studies have found an association between depression and negative effects on the health of HIV-infected individuals, including delays in protease inhibitor initiation, acceleration in disease progression, and an increase in the probability of death (Leserman 2000, Mayne et al. 1996). Quality of life issues have also become increasingly important for people with HIV disease, particularly those on antiretroviral therapy. Antidepressants offer the promise of easing the symptoms of depression among HIV-infected individuals and of possibly lowering total health care costs (Sambamoorthi et al. 2000).

This research investigates self-reported depression and antidepressant use among HIV-positive individuals in Hawaii during 2001 to 2002. It focuses on the importance of race/ethnicity, particularly Native Hawaiian ethnicity, as well as other factors in explaining self-reported depression and self-reported antidepressant use.

While depression and the use of antidepressants have been studied in some HIV-positive populations, most notably whites, African Americans, and Hispanics, there are no published studies of Native Hawaiians. In addition, previous research on depression and antidepressant use in HIV-positive persons has only focused on the Medicaid population (see Sambamoorthi et al. 2000). Because of the economically and socially diverse population used in this study, it can provide broader insights. For example, the research assesses

the importance of income and health insurance on study outcomes.

## Methods

The data source is Hawaii's HIV Seropositivity and Medical Management (HSPAMM) Program, which contains sociodemographic, behavioral, and medical data on HIV infected persons throughout the State of Hawaii. HSPAMM is the largest and most representative source of data on HIV-positive individuals in Hawaii. HSPAMM is a statewide program administered by the STD/AIDS Prevention Branch of the Hawaii Department of Health. Any person residing in Hawaii who is HIV-positive, regardless of income level, is eligible for HSPAMM. The program pays all costs associated with a standard set of services at semi-annual physician visits. At each visit, extensive information is collected from patient questionnaires, physician examinations, and laboratory testing. The HSPAMM program follows these individuals longitudinally through the use of a unique identifier client coding system.

Over 2,500 individuals have participated in HSPAMM since its inception in 1989. Data for this analysis were obtained for all HSPAMM enrollees who made at least one HSPAMM visit during 2001 or 2002. If multiple visits were recorded for an enrollee during the two-year period (which is likely since HSPAMM covers two visits per year), only the first recorded visit for the two-year period was used. During 2001 and 2002, HSPAMM had 1,016 enrollees.

The SAS System version 8.2 was used for all statistical analyses. Logistic regression was applied to the data to identify the variables associated with depression and antidepressant use among HIV-infected individuals in the HSPAMM program. Using stepwise selection, all variables with a p-value of less than 0.30 were removed from successive models until the most parsimonious model was found for each dependent variable. Adjusted odds ratios (OR) and associated confidence intervals were calculated from parameter

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estimate transformations. Odds ratios that exceed 1 indicate an increased likelihood (statistical significance of  $p < 0.05$ ) of self-reported depression or self-reported use of antidepressant medication, respectively.

Both of the dependent variables are dichotomous. The first dependent variable is self-reported depression. Depression is defined as self-reported depression lasting at least two months, self-reported hospitalization for depression during the past six months, or self-reported antidepressant use during the past six months. The second dependent variable is self-reported antidepressant use. Antidepressant use is defined as self-reported antidepressant use during the past six months.

Data for the independent variables were self-reported (gender, race/ethnicity, born in Hawaii, age, income, medical insurance, antiretroviral use, smoke cigarettes, drink alcohol, use marijuana, and use hard drugs), or obtained from laboratory data (likelihood of developing an AIDS-related illness within three years). Hard drugs were defined as cocaine, heroin and/or methamphetamines. Likelihood of developing an AIDS-related illness is a patient severity index that combines both the patient's CD4+T lymphocyte count and RT-PCR HIV plasma viral load, and estimates the likelihood that a patient will develop an AIDS-related illness within three years (Panel on Clinical Practices for Treatment of HIV Infection, 2001). The three categories are: less than 1% likelihood of developing an AIDS-related illness, 2%-16% likelihood of developing an AIDS-related illness, and greater than 32% likelihood of developing an AIDS-related illness within three years. All independent variables were dichotomous except race/ethnicity and likelihood of developing an AIDS-related illness.

## Results

Table 1 presents the sociodemographic, medical, and alcohol and drug use characteristics for the entire study population, for the subset with self-reported depression, and for the subset on antidepressant medication. There were 1,016 HIV-infected persons in the study population and 300 (30%) had self-reported depression. Of the 300 individuals with self reported depression, 146 (49%) reported taking antidepressant medication.

For the entire study population, females comprised 11% and males 89%. Asians accounted for 12%, Native Hawaiians or Part Native Hawaiians 14%, Hispanics 7%, whites 58%, and other races and ethnicities 9%. In the study population, 75% was not born in Hawaii and 61% was 40 years of age or older. Approximately 39% had income less than \$10,000 per year, and only 13% had no medical insurance coverage. Over two-thirds of clients (70%) were on antiretroviral drugs and less than one-quarter of clients (22%) were in the most severely ill of the three patient

	HSPAMM Sample		Self-Reported Depression		Self-Reported Antidepressant Use	
	Number	Percent	Number	Percent	Number	Percent
<b>N</b>	1,016 <sup>§</sup>	100%	300 <sup>§</sup>	100%	146 <sup>§</sup>	100%
<b>Gender</b>						
Female	113	11	34	11	16	11
Male	897	89	265	89	129	89
<b>Ethnicity</b>						
Asian	119	12	28	10	7	5
Native Hawaiian	139	14	25	8	12	8
Hispanic	73	7	25	8	10	7
Other	96	9	32	11	12	8
White	582	58	188	63	104	72
<b>Born in Hawaii</b>						
Yes	256	25	61	21	20	14
No	750	75	235	79	123	86
<b>Age</b>						
40 or more years	615	61	182	61	102	71
Less than 40 years	393	39	116	39	42	29
<b>Income</b>						
\$10,000 or more/year	597	61	155	53	95	66
Less than \$10,000/year	385	39	136	47	48	34
<b>Medical Insurance</b>						
Yes	873	87	257	86	137	94
No	132	13	42	14	9	6
<b>AIDS Illness Likelihood</b>						
>32%	214	22	68	24	26	19
2% to 16%	222	24	63	23	22	16
<1%	525	54	149	53	87	65
<b>Antiretroviral Use</b>						
Yes	714	70	210	70	124	85
No	302	30	90	30	22	15
<b>Smoke Cigarettes</b>						
Yes	402	40	140	47	62	43
No	607	60	158	53	83	57
<b>Drink Alcohol</b>						
Yes	432	43	115	39	57	39
No	570	57	182	61	88	61
<b>Use Marijuana</b>						
Yes	510	50	174	58	79	54
No	501	50	124	42	67	46
<b>Use Hard Drugs</b>						
Yes	188	19	66	22	24	16
No	822	81	231	78	122	84

<sup>§</sup> = Variable totals may not add up to 1,016 or 300 or 146, respectively, due to missing values

severity of illness categories. Fewer than half of all clients used alcohol or any specific drug, except for marijuana, which was used by 50% of all clients.

Table 2 presents adjusted odds ratios and associated confidence intervals for self-reported depression among clients in the entire study population. HIV-infected Native Hawaiians in the HSPAMM program were significantly less likely to have self-reported depression than whites (OR=0.42, 95% CI 0.25-0.71). While Asians also were less likely than whites to have self-reported depression, the difference was not statistically significant (OR=0.62, 95% CI 0.37-1.02).

Three other variables in the model were also found to have an effect on self-reported depression in the study population. First, individuals who smoked cigarettes were more likely to have self-reported depression (OR=1.61, 95% CI 1.18-2.20). Second, individuals who drank alcohol were less likely to have self-reported depression (OR=0.68, 95% CI 0.49-0.93). Third, those who used

Table 2.— Adjusted Odds Ratios for Depression and Antidepressant Use				
	Logistic Regression for Self-Reported Depression		Logistic Regression for Self-Reported Antidepressant Use	
	OR	95% CI	OR	95% CI
<b>N</b>				
<b>Gender</b>				
Female				
Male				
<b>Ethnicity</b>				
Asian	0.62	[0.37-1.02]		
Native Hawaiian	0.42*	[0.25-0.71]		
Hispanic	0.98	[0.55-1.75]		
Other	1.09	[0.65-1.80]		
White	Ref	Ref		
<b>Born in Hawaii</b>				
Yes			0.67	[0.33-1.35]
No			Ref	Ref
<b>Age</b>				
40 or more years			1.67	[0.94-2.98]
Less than 40 years			Ref	Ref
<b>Income</b>				
\$10,000 or more/year	0.75	[0.55-1.03]	2.06*	[1.16-3.67]
Less than \$10,000/year	Ref	Ref	Ref	Ref
<b>Medical Insurance</b>				
Yes			2.21	[0.90-5.44]
No			Ref	Ref
<b>AIDS Illness Likelihood</b>				
>32%			0.73	[0.36-1.45]
2% to 16%			0.53	[0.26-1.09]
<1%			Ref	Ref
<b>Antiretroviral Use</b>				
Yes	1.19	[0.86-1.66]	3.03*	[1.55-5.91]
No	Ref	Ref	Ref	Ref
<b>Smoke Cigarettes</b>				
Yes	1.61*	[1.18-2.20]	1.53	[0.85-2.77]
No	Ref	Ref	Ref	Ref
<b>Drink Alcohol</b>				
Yes	0.68*	[0.49-0.93]		
No	Ref	Ref		
<b>Use Marijuana</b>				
Yes	1.39*	[1.01-1.90]		
No	Ref	Ref		
<b>Use Hard Drugs</b>				
Yes			0.64	[0.31-1.32]
No			Ref	Ref

\* = 95% confidence interval does not include 1.0

marijuana were more likely to have self-reported depression (OR=1.39, 95% CI 1.01-1.90).

Table 2 presents adjusted odds ratios and associated confidence intervals for self-reported antidepressant use among members of the study population with self-reported depression. The final logistic regression model created through stepwise selection did not include the race/ethnicity variable. Thus, race/ethnicity, including Native Hawaiian ethnicity, is not considered to be an important determinant in whether an HIV-infected individual with self-reported depression is on antidepressant medication.

The logistic regression model did identify two variables of significance for antidepressant use in this population. Depressed individuals with an income of \$10,000 or more per year were more likely to be treated with antidepressant

medication (OR=2.06, 95% CI 1.16-3.67). Also, depressed persons on antiretroviral therapy were more likely to take antidepressant medication (OR=3.03, 95% CI 1.55-5.91).

## Discussion

The prevalence of depression among HSPAMM enrollees—30 percent—is similar to other studies of depression in HIV-positive individuals (Penzak et al. 2000). However, since this group may include some individuals who do not have clinical depression, the actual prevalence of clinical depression in this population is probably lower. The proportion of depressed HSPAMM clients on antidepressants—49 percent—is similar to that cited in another published study (Sambamoorthi et al. 2000).

The analysis shows important differences between racial/ethnic groups in self-reported depression. Native Hawaiians had significantly lower adjusted rates of depression than whites and the lowest rates of any racial/ethnic group in the study. Asians also had lower adjusted rates of depression than whites, but the rates were not statistically significant.

These results raise interesting questions. Why do Native Hawaiians have the lowest depression rates of any racial/ethnic group? Is it due to cultural reasons, family support in Hawaii, support networks in Hawaii, genetic factors, coping strategies? Further studies investigating these questions might provide valuable insight into depression among HIV-positive people in Hawaii and allow for the development of better treatment and coping strategies not only for Native Hawaiians with HIV, but also for other affected racial/ethnic groups.

The study found that persons using tobacco were significantly more likely than non-users to have self reported depression. The higher likelihood of depression among tobacco smokers and marijuana users may be a result of depressed individuals treating their depression through tobacco or marijuana use. Conversely, alcohol drinkers were significantly less likely than non-drinkers to have self-reported depression. These findings appear counterintuitive, as one might expect drinkers to have higher rates of depression. The explanation may be an artefactual one, as this variable does not separate social drinking from alcohol abuse. Individuals who drink in moderation may find alcohol to be a way to relax and cope with stress, instead of creating or deepening depression as can be the case in alcohol abuse.

The study found no significant differences in antidepressant use by race/ethnicity. This finding is a positive result of the study. It suggests that there are not race-related differences in access to antidepressant medication for HSPAMM clients with self-reported depression.

While antidepressant use was not associated with race/ethnicity, it was associated with taking antiretroviral medication. Since the study results do not indicate that taking antiretroviral medication predisposes one to depression, they may suggest that taking medication for HIV increases the willingness of an individual to take antidepressant medication for their depression.

Antidepressant use was income sensitive. Individuals with incomes greater than \$10,000 per year were more likely to be treated with antidepressants. These results indicate that, in spite of the generous eligibility requirements and benefits available through its HIV Drug Assistance Program (HDAP), income is still a key factor in determining whether an HIV-positive individual receives needed medication in Hawaii. More research is needed into why these barriers exist and how to improve access to appropriate medications for Hawaii's HIV-positive poor population.

A critical issue raised by this research is why only half of HIV-infected persons with self-reported depression are taking antidepressants. While some HSPAMM patients reporting depressive symptoms may not have clinical depression and some may be treating their depression through non-pharmacological means (e.g., psychotherapy), it is likely that many patients who could be helped through antidepressants are not being treated. Some physicians may consider depressed mood to be a normal state in patients with HIV disease. They may attribute fatigue, sleeping problems, or loss of appetite solely to HIV or medication side effects and not recognize the full effects that depression may be having on functioning (Sambamoorthi et al. 2000). Some patients may not want to add another drug to a complex medication regimen or accept side effects further limiting their functioning (Sambamoorthi et al. 2000). Physicians should work with patients to properly treat depressive symptoms as many antidepressant medications bring rapid clinical response, are easily tolerated, and can be used during the latest stages of HIV disease (Sambamoorthi et al. 2000). Further, depression may be influencing somatic symptoms and antidepressant treatment can produce improvement in these symptoms (Sambamoorthi et al. 2000).

The study had some important limitations. First, while reflective of the HIV epidemic in Hawaii, over half of the sample was comprised of whites; sample sizes for other racial/ethnic groups were

much smaller. Second, because most of the data was self-reported by respondents and collected by the HSPAMM program through an anonymous data collection process, the reliability and validity of these data could not be verified. Third, the individuals enrolled in HSPAMM are likely less disenfranchised individuals. These are individuals with a primary care provider. Individuals who are not receiving care for their HIV infection or are receiving it in a haphazard way tend not to enroll in the HSPAMM program.

This research provides evidence that Native Hawaiians living with HIV have a lower prevalence of depression than other racial/ethnic groups, but not different antidepressant usage patterns. Asians also have a lower prevalence of depression than whites, although the results were not statistically significant. Further research into the reasons for these differences, as well as other questions associated with depression and antidepressant use in the HIV-positive population in Hawaii, could provide important information guiding the treatment of individuals with HIV infection and improve their quality of life.

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